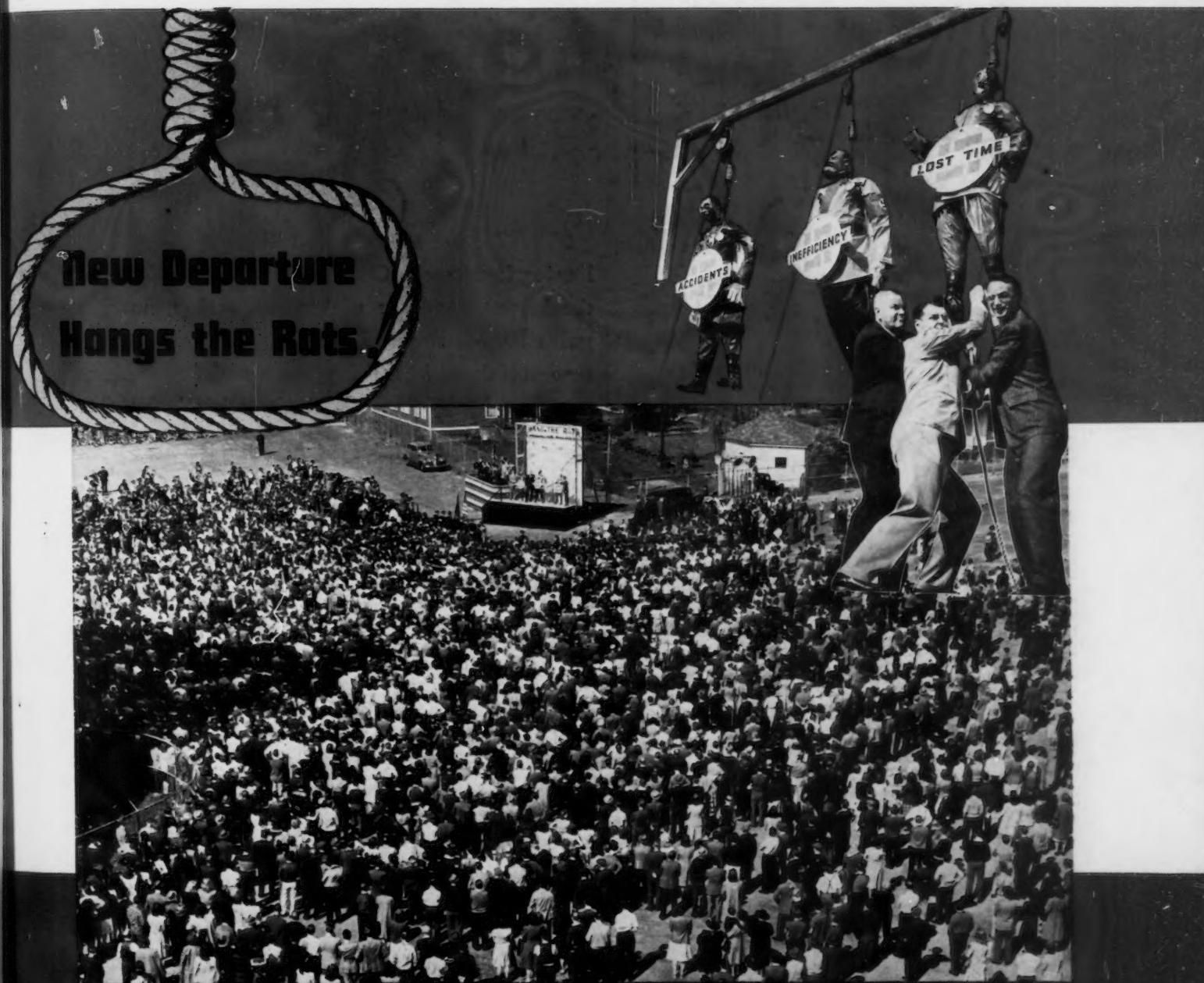


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The **IRON AGE**



The spontaneous slogan
"New Departure Hangs the Rats"
was born at a recent
Depression meeting in New York,
thus doing away with the need
of the three most important
of the things that stand in the way
of New Departure's program of
use, progress and prosperity
—for production, for
Wealth, for Democracy.

no plane, tank or
ship can be built or
run bearing when
it has been caused by
inefficiency, carelessness
and accidents.

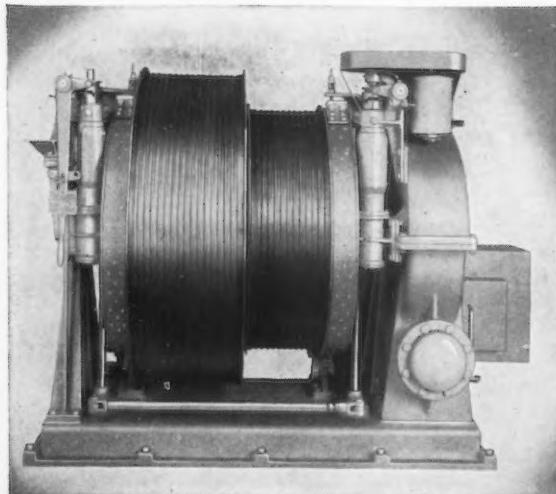
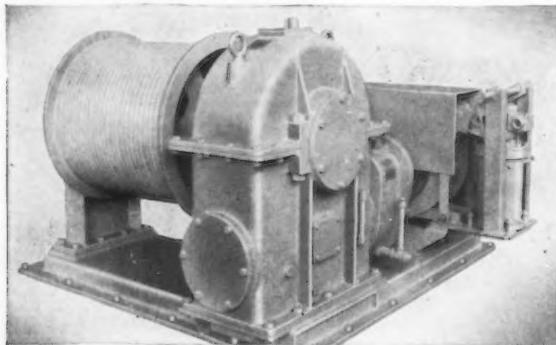
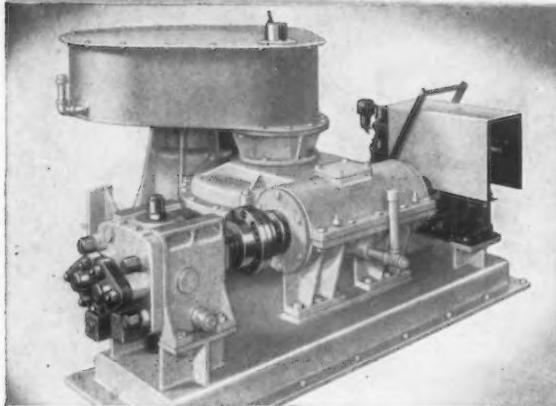
For details of this dramatic

employee morale battle
drawn ask for the latest issue
of the "New Departure News".



NEW DEPARTURE BALL BEARINGS

Clevelands WITH THE UNITED STATES NAVY



During its 30 years, Cleveland not only has become the largest producer of Worm Gearing, but has gained wide appreciation for its Engineering resourcefulness in making successful installations on unusual jobs throughout all major Industries.

From this continual, long-range development have come Standard Types in ample ranges of capacities and ratios which meet nearly all specifications; and Worm Gearing of special design for those which do not.

Through years of diversified experience doing a single job successfully, we are honored to serve the United States Navy through the contractors who supply Cleveland-operated Deck Machinery. The Units illustrated here are typical.

The Cleveland Worm & Gear Company, 3252 East 80th Street, Cleveland, Ohio.

Affiliate: *The Farval Corporation, Cleveland, Manufacturers of Centralized Systems of Lubrication.*

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PEACOCK BROTHERS LIMITED



CLEVELAND
WORM GEAR *Speed Reducers*

JULY 2, 1942

VOL. 150, NO. 1



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THE IRON AGE

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Switch to *NE Alloy Steels* to Save Critical Metals

TO HELP conserve nickel, chromium, vanadium and other scarce metals, the War Production Board's ablest metallurgists have developed NE (National Emergency) Alloy Steels. These new steels contain relatively small quantities of alloying elements in such combination as to produce physical properties usually attributed to steels of much higher

alloy content. The War Production Board stipulates the use of the new NE Alloys to replace the standard SAE and AISI Alloy Steels for a wide range of applications.

Ryerson NE Alloy Steel stocks in six specifications, all fine grain, will be available shortly; and will consist of sizes ranging from $\frac{1}{2}$ -inch to 7-inch rounds, in three groups:

Carburizing Grades

NE 4023 and NE 8620.
To Replace AISI and SAE
Nos. A 2300, A 2500, A 3100,
A 4100, A 4600, A 5100, A 6100.

Medium Hardening Grades

NE 4042 and NE 8744.
To Replace AISI and SAE
Nos. A 2330-35, A 3130-35,
A4130-35, A5130-35, A6130-35.

High Hardening Grades

NE 4047 and NE 8749.
To Replace AISI and SAE
Nos. A 2300, A 3100, A 3200,
A 4100, A 4600, A 6100.

Only limited data on heat-treatment response or physical properties will be available when NE Alloys are first ready for shipment. The WPB is anxious to know how these new steels will function and requests all NE Alloy users to report results in working with these new steels. Ryerson will cooperate fully with

users, supplying laboratory test data, and all other available information.

If you now use Alloy steel, let Ryerson help you in adapting NE Alloys to your requirements wherever possible. Write, wire or phone the nearest of the ten Ryerson plants.

JOSEPH T. RYERSON & SON, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

RYERSON STEEL-SERVICE

THE IRON AGE

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JULY 2, 1942
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ESTABLISHED 1855
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Don't Slug 'Em with Slogans

SLOGAN writing has been called an art. I am inclined to call it a disease which becomes epidemic in time of war. Then everyone seems to want to write a slogan urging some other guy to do his duty.

A slogan, psychologically, is supposed to arouse action through a mental shock similar to the physical awakening conveyed by a shot in the arm or a kick in the pants. It has impact. Personally, I prefer leverage to impact because it goes farther and lasts longer. The leverage of persuasion, I think, is superior to the slug of a slogan.

Slogan writers always write for the other fellow. I never yet knew anyone who wrote slogans for himself. That would be getting too personal.

I think the War Production Board is making a mistake in having its War Production Drive division send out slogan posters to makers of munitions. Especially such gems of inspiration as "Work Wins War;" "Count Me in This War;" "Shake a Leg, Mister;" "Give It Your Best." I hope that you will not plaster your walls and bulletin boards with these inanities, because any intelligent worker will and should resent them.

The average American worker, man or woman, likes his boss to talk to him but not to shout at him. And a slogan is a shout. Furthermore such admonitions as "Do Your Duty" conveys the implication that the boss is doing his, but that you are not doing yours. And this is a superiority concept that the self-respecting employee finds hard to swallow.

There are so many other and superior ways to inspire people to do their best in helping to win the war that we should not waste our time on slogans. And one of the best ways is to show each worker just how his work helps toward that end. A great many people are working on important things which fit into the war program but do not know it.

I heard of a typical case recently. A woman who for years had been assembling links in driving chains came to her foreman and asked for a change of jobs. "I want to do something," she said, "that will help to win this war." When the foreman told her that she was making chains for "jeeps" she went back to her bench perfectly satisfied. After this experience, the management of that company lost no opportunity for explaining just where each worker's job fitted into the war program. It was not as easy as posting ready made slogans, but much more effective.

Another fine way to stimulate cooperation from top to bottom is to post performance records against schedules. Every member of any team wants to know the score. If they are ahead, they are not going to slow down but if they are behind, they will burst their buttons to catch up.

So I say, "don't slug them with slogans." It's a cheap and easy way, but that way is never the best.

Again, We Fight for Freedom



"Yesterday the greatest question was decided which ever was debated in America—." So wrote John Adams on July 2, 1776, when the Continental Congress voted independence. Two days later on July 4th Congress adopted the Declaration of Independence.

AMERICA is about to commemorate one of the greatest events in human history—the Declaration of Independence, signed July 4, 1776. With but few exceptions, the Anniversary of Independence has been a day of peace. But, now we are at war—fighting to preserve the freedom so gallantly won by our forefathers more than a century and a half ago.

This year America's fighting men are at battle stations—in Australia, the Far East, Iceland—around the world. At home, millions of skilled workers will not think of Independence Day as one for rest and pleasure—but, as a day for the making of more ships, tanks, guns, shells—a day of work, dedicated to victory and to freedom.

At Inland, as throughout America, men will be sweating and toiling—white streams of molten steel will be cascading from great open hearth furnaces—enormous mills will be rolling plates, shapes, billets, bars—the tough steel from which America makes its fighting tools.

Yes—the Fourth of July—traditionally a day of celebration—will be a day of work—and, Inland men will be on the job, doing their part in the new fight to uphold these truths, "—that all men are created equal, that they are endowed by their Creator with certain unalienable rights, that among these are Life, Liberty, and the Pursuit of Happiness."

Dedicated
to Victory

INLAND STEEL CO.

Brass Cartridge Cases Drawn With Cemented Carbide Dies

... From 600,000 to 1,000,000 artillery shell cases can be drawn with a single carbide nib, according to the experience of one of the first manufacturers to get started on this class of ordnance work.

ONE of the largest producers of brass cartridge cases in the United States was in peacetime an important steel stamping contract shop producing automotive parts, refrigerator parts, kitchen sinks and washing machine tubs. This company started to think in terms of artillery shell cartridges in December, 1939, long before the greater part of American industry was even willing to consider defense work. The company officials made a survey of their facilities and after conferences with the War Department subsequently received, in October, 1940, a letter of intent to manufacture 3-in. anti-aircraft and 105-mm. howitzer cartridge cases. Although the company had a large number of deep drawing presses for its regular production, with but one exception it was decided to put in an entirely new line for the artillery shell cases. This was more than a year before "Pearl Harbor" and business for the country as a whole was on an "as usual" basis.

Upon receiving the letter of intent, all special equipment, including hydraulic presses, automatic chucking machines, annealing furnaces, pickling tanks, dies, tools and gages were ordered immediately. About six months later, the first pilot run was made. In a

couple of days these first cases were proof tested at Aberdeen and accepted by the Ordnance Department. Then production began in earnest. In less than six months, the millionth case had been produced. That was last summer. The second millionth case long since has been passed, and equipment is now on order which will double present daily output.

Hence the practices set up at this contracting plant have been tried and tested. Furthermore, some significant life data have been obtained on the cemented carbide drawing dies or nibs used for all the redrawing operations.

The layout is on the basis of line production methods, with very close coupling between the various units so as to reduce material handling to a minimum. The lines are doubled back on one another with aisle space hardly a foot wide. The presses are rigged up, for example, so that they push the cases into hot water rinse tanks. The cases are pulled directly out of the rinse tank by hand, drained and loaded on the annealing furnace conveyors.

From the discharge end of the annealing furnaces, the work is racked for the pickling and cleaning operations. After pickling, they go to the next press, and so on. There is practically no provision for even temporary storage of work in process. It must keep moving. The entire working force is paid on a group bonus system, the bonus being governed by the number of finished cases that pass government inspection and are loaded in the shipping cartons.

Some of the general features which the company believes significant are the proper lubrication of the work in the cupping, redrawing, heading and tapering operations; absolute cleanliness maintained throughout the processing; accuracy in annealing temperature control and absolute laboratory control throughout. In fact, one of the most significant factors is that the laboratory has full control over annealing temperatures and maintains a representative on the operating line on a three-shift basis.

For this work, a complete physical and chemical testing labor-

By FRANK J. OLIVER
Technical Editor, THE IRON AGE

atory has been set up. Every 20,000th case is brought into the laboratory and completely checked. Tensile specimens are milled out of the base material and also out of the tapered mouth and are pulled in a modern dial type machine. Equipment was installed to make microphotographs of these sections to check grain size, but it has been found that there is sufficient correlation in physical properties to

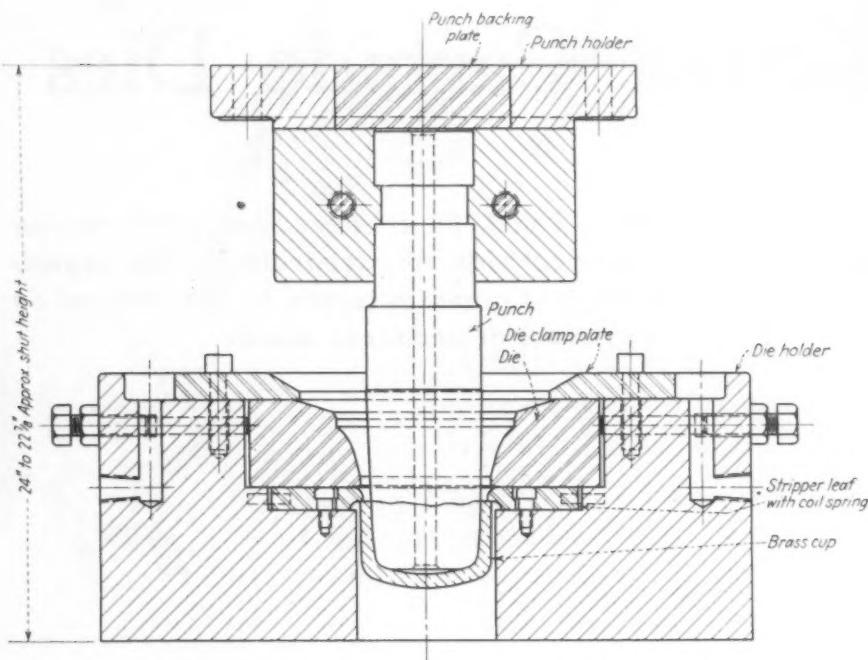
for the subsequent redrawing operations because of the progressively longer strokes required as the case elongates and because of the uniformity of speed that can be maintained throughout the stroke. For the first, second and third redraws the corresponding press ratings are 150, 100 and 75 tons, the pressures required being in the descending order as the reduction in diameter and in wall

thickness per draw is required. Rapid advance, slow down to pressing speed, reversal of ram and rapid return are governed by trip dogs that may be readily adjusted to suit each condition.

Fig. 1 shows a cross-sectional view of the cupping die used for the 105-mm. case. Although carbide dies are being successfully used elsewhere for this initial operation, in this particular set-up a water hardening tungsten (3½ per cent) steel die material is used.

Ironing Action

The disk is approximately 7 in. in diameter and is loosely positioned in the die when it is dropped in place. There is no land to resist the disk in the initial draw-in stage and the radius at the mouth is blended into the straight conical section of the die where ironing commences. This type of single action drawing is called an ironing operation since the base thickness remains uniform during the various draws, whereas the sidewall thickness is constantly being reduced or crowded back through a restricted annular orifice formed between the punch and drawing ring. The natural tendency of the wall would be to thicken as the diameter of the case is reduced, or in the cupping operation where the



obviate this additional check, when the hardness numbers are included.

Cartridge brass contains about 70 per cent copper and 30 per cent zinc. It comes in from the brass mill in the form of heavy, flat disks so as to minimize the amount of scrap returned to the mill. The first operation is to cup these blanks, after which they are annealed to overcome work-hardening and restore the brass to the dead soft condition. The press work on the case is then completed in three redraws. The procedure for the 105-mm. howitzer case will be detailed as it is typical of both production lines.

Cupping of the disk is the first operation. It is done in a mechanical press of 600-ton capacity, although only 150 tons of pressure is required for the 105-mm. shell case. This press was taken off peacetime production and put in at the head of the case line. All the other presses are automatic cycle hydraulic types and were purchased especially for this work. Hydraulic presses are well suited

ABOVE

FIG. 1—Cross-sectional view of the cupping die for the 105-mm. howitzer shell case. Die material is a 3½ per cent tungsten bearing steel. Punch, die and blank are doused with a water emulsifying lubricant.

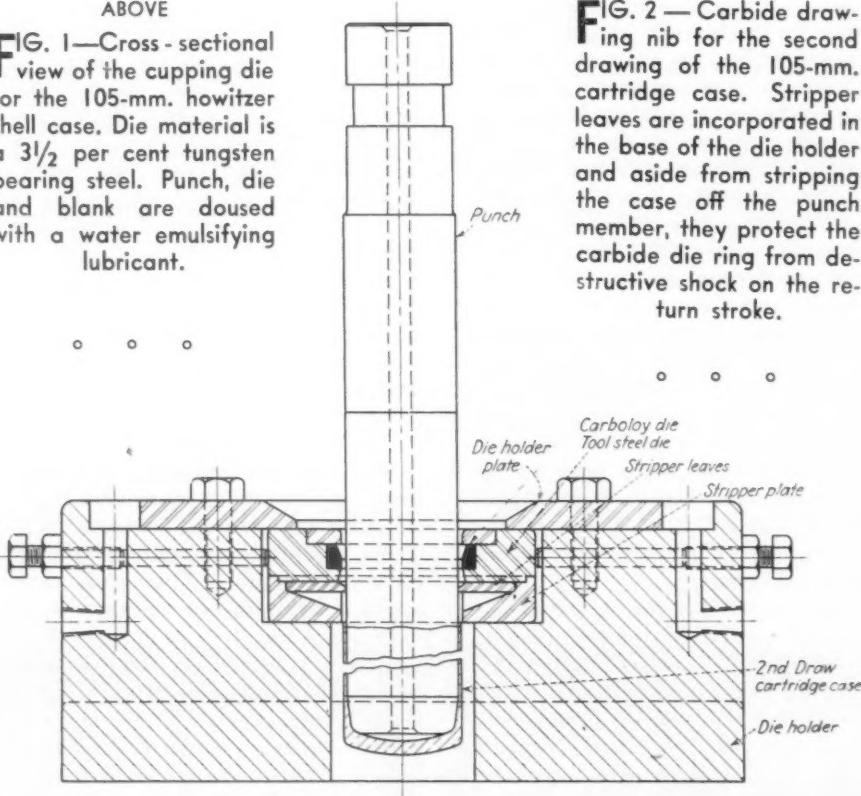
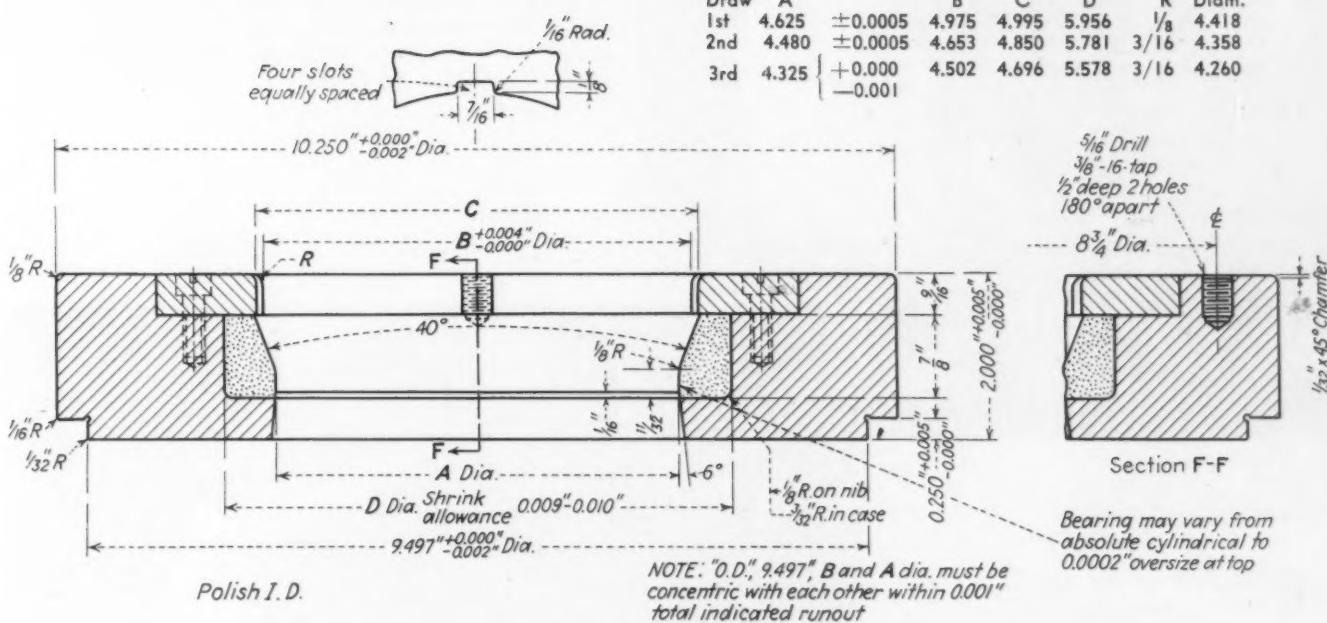


FIG. 3—Design details of the Carbolyo nib for the 105-mm. howitzer case.

KEY DIMENSIONS, INCHES

Draw	A	B	C	D	R	Punch Diam.
1st	4.625	± 0.0005	4.975	4.995	5.956	$\frac{1}{8}$
2nd	4.480	± 0.0005	4.653	4.850	5.781	$\frac{3}{16}$
3rd	4.325	$+0.000$	4.502	4.696	5.578	$\frac{3}{16}$



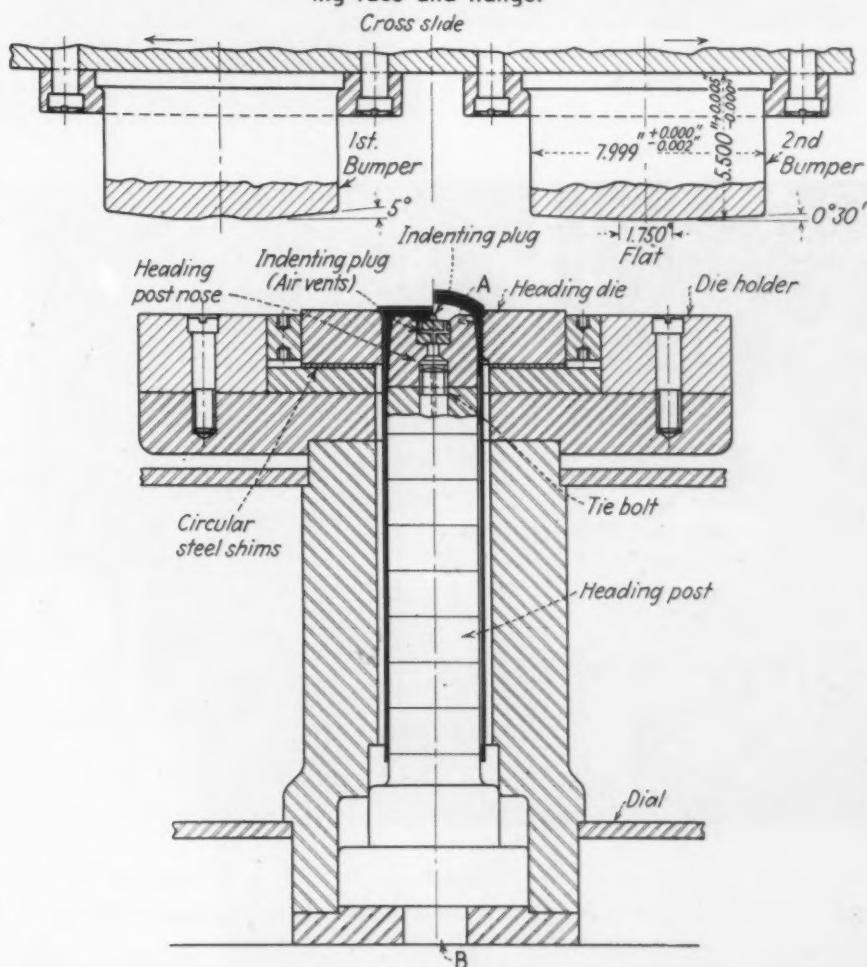
disk diameter is shrunk drastically to the cup diameter.

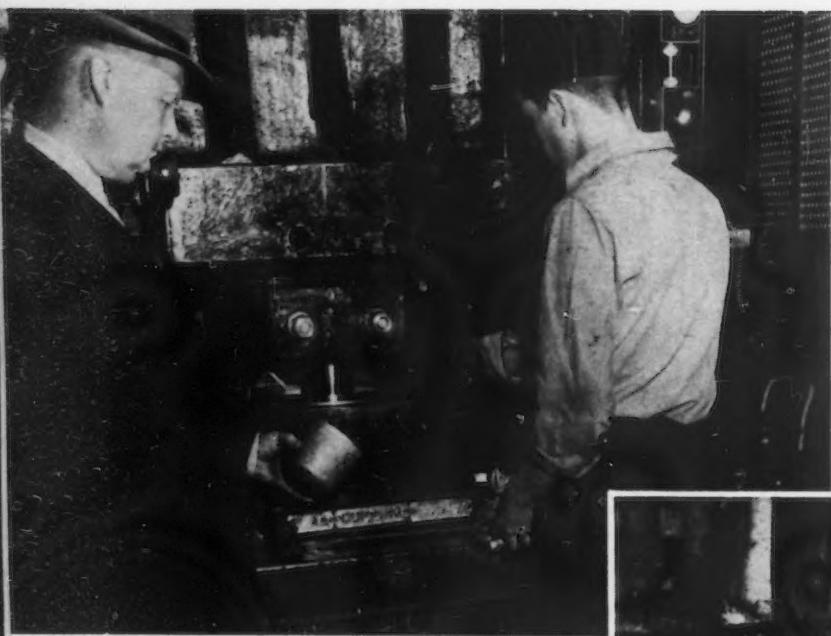
While a reduction of the case o.d. takes place in each stage of redraw, it is not nearly so much on a percentage basis as is the reduction of wall thickness accomplished by the ironing process. For example, for the 3-in. A.A. cases, the reduction in wall thickness per draw ranges from 37 to 42 per cent, and for the 105-mm. cases, 34 to 42 per cent. The greatest reduction in diameter is 9 per cent for the first draw on the 3-in. cases and 5 per cent for the corresponding draw on the 105-mm. case. On the third draw, the reductions in diameter are 3 and 3½ per cent respectively.

Referring again to Fig. 1 showing the cupping operation, it will be noted that the ironing process forces the cup tightly against the punch and must be stripped by the stripper leaf fingers which hook the edge of the cup on the return stroke of the punch. These stripper leaves are backed up by small coil springs which permit them to slide out of the way when the cup is pushed through the die.

Disks are delivered to the cupping press by being rolled on edge down a wooden incline from the receiving platform. Completed cups are carried through a skeleton tube to a hot water rinse tank at the rear of the press. This simple, S-shaped conveyor tube is made up

FIG. 4—Cross-section of the two-stage heading die. The first bumper has a spherical depression in it that allows the metal to bulge at this point. In flattening out this bulge, the second bumper displaces the metal into the primer boss in the interior. Shims under the heading die regulate the thickness of stock left in the base of the case. An allowance is left for machining face and flange.





LEFT

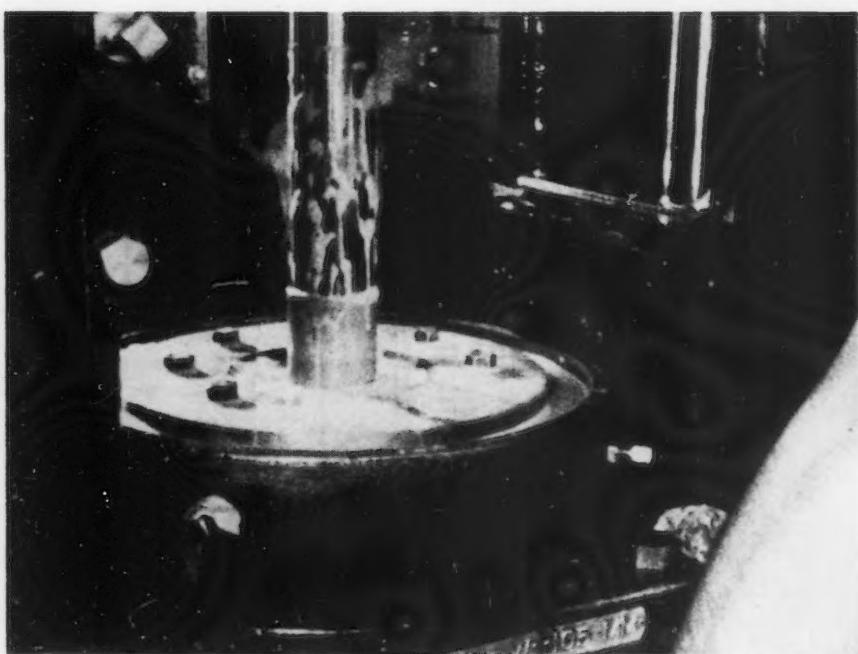
BRASS disk and cup made from it, the first operation in the drawing of the 3-in. anti-aircraft shell case. Note channel steel troughs at the extreme right by which disks are rolled down to the press from the receiving platform.

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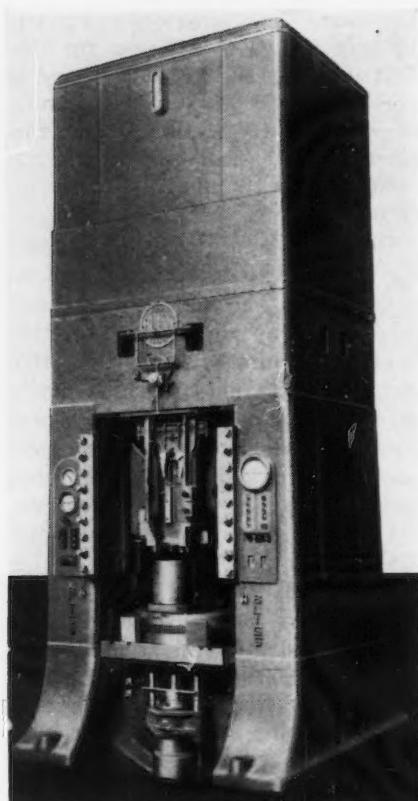
BELOW

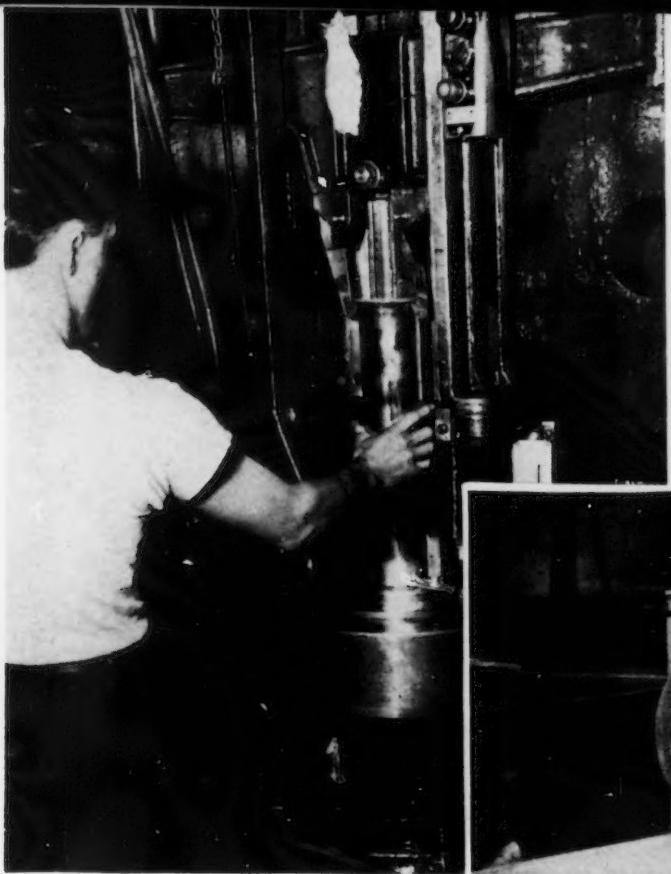
START of the second redraw on the 105-mm. shell case. Punch is shown covered with soluble oil compound.



RIGHT

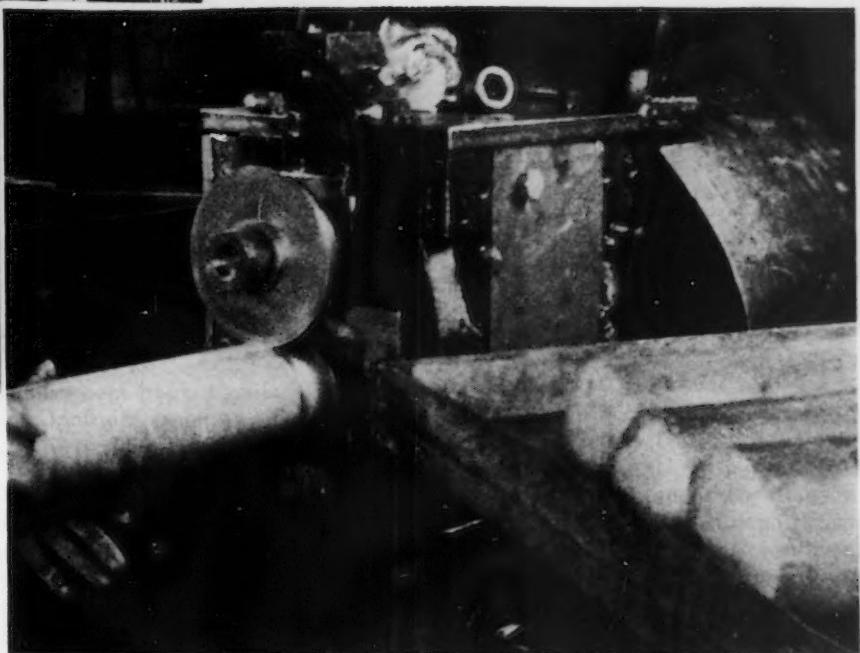
2000-TON, two-station dial feed heading press. Dial is indexed 180 deg. by pneumatically actuated rack and gear.





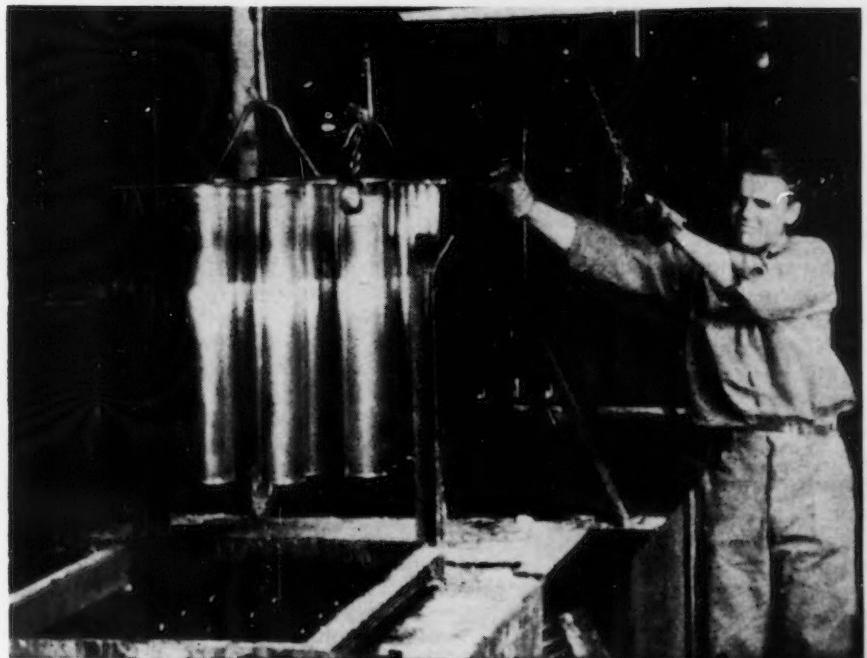
LEFT

CLOSE-UP of the loading and unloading position of dial on the heading press. This view shows tongs on air hoist pulling case off the heading post after it has been partially lifted by a hydraulically actuated ejector operating from below.



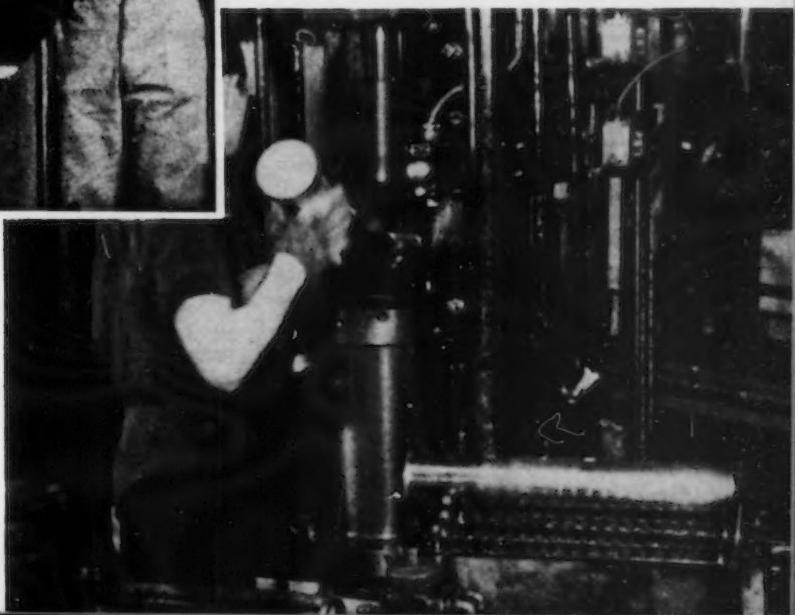
RIGHT

Trimming case with disk cutter.



BELOW

AFTER the sides of the case are lubricated by the rolls shown at the right, the mouth end of the case is placed in the top of the die and forced into it close to the shoulder or flange of the case by the bumper in the ram of the press, thus tapering the open end. The case is stripped from the die by a knockout rod.



ABOVE

BEFORE tapering the mouth ends are annealed in molten saltpeter.

of a bundle of five or six wire rods spaced around a circular cross-section. As soon as this "tube" is filled, the ram of the press, by pushing a fresh cup into the tube, automatically shoves the whole stack of cups ahead and drops one off the end into the rinse tank.

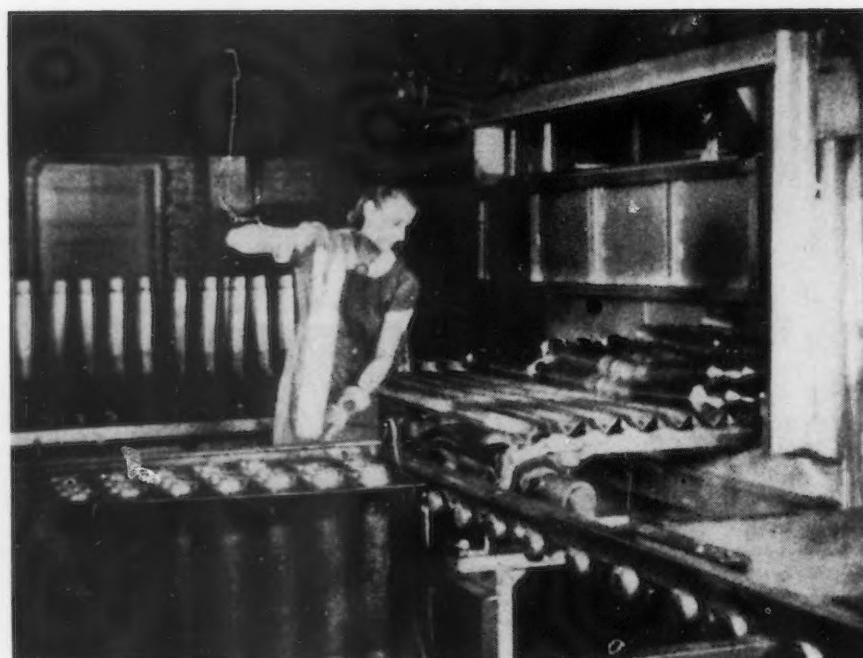
Importance of Lubrication

Lubrication of the punch dies and work is one of the controlling factors in successful single action drawing or ironing operations. At the same time it is essential that the work enter the annealing furnace in a clean condition. Otherwise, any oil film will char and leave a carbon deposit on the case, increasing the difficulties of pickling and cleaning. In this particular plant, a water soluble sulphonated oil is used, mixed in a ratio of about 1 gal. of compound to 13 gal. of water. This coolant is directed into the die in copious quantities. It is readily removed from the work simply by a hot water rinse.

The work done in the cupping operation is fairly drastic, but this has been found by ordnance engineers to be advantageous. For one thing, a more uniform distortion of the grain structure is obtained, thus lessening the annealing time required for complete recrystallization between redraws. Incidentally, although grain growth in cartridge brass begins at around 500 deg. F., to insure rapid and complete recrystallization and produce a dead soft condition, the work temperature for anneal between redraws is around 1100 deg. F. Annealing is done after the cupping operation and after the first and second redraws. There is also a final stress relieving operation under somewhat different conditions, besides a mouth anneal prior to the tapering operation.

Use of Carbide Dies

Fig. 2 shows a cross-section of a punch and die set for the second draw, which is typical of the die mounting for all three redraws. Details of the Carboloy die rings or nibs are given in Fig. 3 and accompanying table of die and punch dimensions. A somewhat different type of stripper leaf is used on these dies in place of the leaves on the cupping die. Aside from carrying out their primary function of stripping the case from the punch, they serve the important function of protecting the carbide nibs from any stripping action,



CASES being loaded in continuous stress relieving furnace, which determines the final physical properties of the case.

which would be ruinous because of the shock involved. So far, carbide nibs have not been applied to the cupping die although they have been successfully used at Frankford Arsenal, which has carried out all the development work on cartridge case manufacture for the Ordnance Department. As a matter of fact, the tungsten steel dies now used in the cupping operation are giving about as good a performance in terms of die life as are the carbide dies on the three redraws inasmuch as the length of ironing action is relatively short, compared to that of the redraws.

The remarkable fact about these carbide inserts and the thing that justifies their use economically is the life obtainable. The experience of this particular company indicates that these carbide drawing rings will produce from 600,000 to 1,000,000 casings before wearing sufficiently oversize to warrant scrapping. This is about five times the life obtainable from alloy steel dies in similar applications.

Although the Carboloy die for the 105-mm. shell only is illustrated, the same relative dimensions hold for the dies for the smaller cases. In both sizes the nib thickness is $\frac{1}{8}$ in., maximum wall thickness about $11/16$ in. and included mouth angle 40 deg.

The complete sequence of operations on the shell case is as follows:

1. Cup disks in 600-ton Bliss mechanical press

2. Rinse in hot water to remove drawing compound

3. Place in baskets and anneal at 1100 deg. F. for 7 min. in Surface Combustion continuous, recirculating type, gas-fired with chain-in-channel conveyor. Baskets loaded on furnace chain

4. Remove from furnace, pickle and wash

5. First redraw in Bliss 150-ton hydraulic press

6. Rinse in hot water

7. Anneal

8. Pickle and rinse

9. Second redraw in Bliss 100-ton hydraulic press

10. Rinse in hot water

11. Anneal

12. Pickle and rinse

13. First trim to length with disk cutter

14. Third redraw in Bliss 75-ton hydraulic press

15. Wash in hot water

16. Second trim to length in V & O automatic disk trimmer

17. Head and indent in Bliss 2000-ton hydraulic press

18. Anneal mouths in molten salt-peter at 600 deg. F. (Surface Combustion gas-fired equipment, with removable fixture to vent air from inside of cases)

19. Oil cases with power driven oiling rolls

20. Taper mouths of cases in Bliss 75-ton press

21. Machine flange, face head and drill and ream primer hole of case in New Britain-Gridley automatic chucking machine

22. Trim case to final length and gage in Avey drill press

23. Salt anneal mouths



THE chamber gage is a type of "Go" gage that corresponds to the gun chamber. Oversize cases will stick in the chamber. Cases on size or under will enter freely and bounce right out. There is an additional check for minimum diameters.

24. Stress anneal in Surface Combustion continuous, recirculating gas-fired, two-zone furnace, with angle iron slat conveyor. Furnace has two burners and blowers with separate pyrometer control on each
25. Place cases on cooling conveyor
26. Final inspection
27. Stamp with identification in 30-ton Bliss hydraulic press with dial staking fixture
28. Load cases in cartons.

The pickling equipment consists of two sets of four tanks each. In each set there is a lead lined acid tank, lead lined cold water rinse tank, soap tank and final rinse tank. The acid tank contains 10 to 15 per cent sulphuric acid and 10 per cent copper sulphate, minimum. The pickling solution is kept at a temperature of 160 to 180 deg. F. by a lead steam coil. The soap tank has a solution made up of $\frac{1}{4}$ oz. per gal. of alkali cleaner plus $\frac{1}{6}$ oz. soap chips per gal. approximately. This tank is also heated with a steam coil and the final rinse tank has running water heated with the exhaust from the other two tanks.

Cases in baskets loaded at the discharge end of the annealing furnaces are immersed in the acid tank until scale is removed, and then are drained, immersed and drained successively in the other three tanks. Handling is by pneumatic hoists on monorails.

*Actually a 50-50 mixture of sodium and potassium nitrate.

The heading and indenting of artillery shell cases are of great importance as the amount of cold work performed on the head determines to a great extent its final physical properties. Care must be exercised to get the proper amount of hardness in the head and in the primer hole as well as the proper contour inside the case at this point. The primer hole boss must be fully formed around the indenting plug of the heading post nose and the head must not have any "cold shuts" or cracks develop beyond the intersection of the tangent lines of base and side wall.

Heading Practice

The way the job is done at this plant is somewhat different from conventional practice. The head is "bumped" in two stages in order to complete the plastic flow of the metal without causing any cold shuts. Instead of using a slightly conical shaped bumper at the first station, however, in this particular instance the bumper is recessed in the center in the form of a shallow spherical segment of about 3 in. radius. This recess permits the metal to bulge out during the first stroke so that when the flat in the middle of the second bumper hits this bulge, the volume of metal is displaced into the interior, thus adding metal to the primer boss in the interior of the case. Indenting

of the primer hole is performed in the same die set-up and together with the reversal of metal obtained as mentioned above is a considerable factor in achieving the proper hardness at this point. The whole operation is such as to leave the outside of the head approximately flat and of uniform hardness throughout.

This heading operation is performed on a 2000-ton Bliss hydraulic heading press equipped with a two-station pneumatically operated dial feed, a two-station punch holder which is slid back and forth pneumatically, a motor driven hydraulic ejector and a hand operated air hoist. The press is arranged with a fully automatic cycle. When a case is placed in the forward station, pressing the start button will cause the dial to rotate, bringing out the previously headed case and placing the new case under the ram.

While the ram is descending to bring the first bumper into action, the ejector rises and lifts the finished case from the forward station, allowing the operator to pick it off with the air hoist and tongs. At the completion of the first stroke the reciprocating punch holder brings the second punch or bumper into position automatically. During the second pressing stroke, the ejector returns to its starting position and the operator loads a new case over the heading post in front of him. Control of the press is such that the ram will descend rapidly, change speed before contacting the work, exert a given predetermined pressure and then automatically reverse. The various cycles are interlocked so that the ram cannot descend unless the dial and punch holder are in proper pressing position.

For this heading operation, the same lubricant which is emulsified for the drawing operation is used in straight grease form on the punches and work. It is one of the factors in getting a proper flow of metal in the head.

Mouth Anneal and Tapering

Tapering is the next press operation. This follows after the mouth anneal which is done by inverting the shell cases over air vent tubes in a bath of molten saltpeter* at 940 deg. F. The mouth of the case is annealed not only to insure ease of tapering, but also to make the metal "stay put" after the operation in order to come within the contour limit specified. The cases are racked for this annealing op-



FINAL inspection line. These girls check wall thickness at mouth, various diameters, length, flange diameter and width.

ration and are lowered in a group over the air vent pipes which protrude from the saltpeter bath, since the primer hole is still closed and would otherwise block the escape of air when the cases are lowered into the bath.

Immediately after completion of the annealing operation, the case is quenched in cold water which at

the same time washes off the salt.

The tapering operation itself is simple enough, consisting merely of pushing the mouth of the case into a restricted die ring, pressure being applied at the base of the case. As in other operations, lubrication is important here and is generously applied on the outside of the shell case near the mouth by a

set of power driven trunnion rolls on which the case is rotated. The lubricant for tapering is a mixture of lard oil and kerosene.

Following the tapering operation, the cases are chucked and machined at the base in a battery of New Britain-Gridley automatic chucking machines. Using carbide tipped tools the flange is trimmed and the base faced, followed by drilling and reaming of the primer hole. Trimming to length and chamfering of the mouth is done in a two spindle Avey vertical drill using four cutters in the form of a hollow mill.

Salt annealing of the mouths once more and stress relief annealing of the entire cartridge case follow. This stress relieving operation is an extremely important one as it is intended to equalize any internal stresses in the case and at the same time not to destroy the high physical properties set up by the various cold working operations. If stress relieving is carried out properly, recrystallization takes place across the slip planes caused by the cold working, but the crystals are very fine and no diminution of physical properties occurs. If annealing is allowed to proceed at an elevated temperature and for a long enough time, grain growth takes place and the physical properties drop until the dead soft condition is reached.

Russian Sturmovik and Japanese 00 Aircraft

TWO military aircraft that have excited great interest in the present war are the Russian Sturmovik and the Japanese Mitsubishi 00 navy fighter. The Sturmovik has raised havoc with German tanks, and the Mitsubishi 00 has given American fighters some painful moments.

The U. S. Naval Institute Proceedings, in a recent issue, refers briefly to use of rocket aerial bombs used by the Sturmovik, the Russian airplane designed especially for combating tanks. The equipment includes two effective types of weapons: four 37-mm. guns and ten 100-kg. armor-piercing bombs. Each of the latter, with reinforced head, is equipped with a rocket containing 5 kg. of powder, which for 4 or 5 sec. gives it additional speed.

This penetrating bomb is re-

leased at an altitude of 300 meters, and the rocket ignites immediately upon leaving the bomb rack. The velocity acquired by the plane's dive and pull of gravity is augmented by the combustion of the rocket charge, so that the bomb strikes its objective with three times the hitting force that it would have without the added impulse of the rocket. The aerial attack is carried out on the upper part of the tank, where armor plate is thinnest.

Some details of the Japanese Mitsubishi 00 navy fighter, released by the English Air Ministry, are given as follows: Low-wing, single-seat monoplane of all-metal stressed-skin construction; powered with a Nakajima N.K.I. 14-cylinder, air-cooled radial engine developing 900 hp. at 15,000 ft.;

armament, two 7.7-mm. cannon firing through the propeller disk and two 20-mm. cannon situated in the wings; the maximum speed (with normal flying weight of 5140 lb.) 315 miles per hr. at 10,000 ft.; service ceiling, 36,000 ft.; range, 590 miles at 265 miles per hr. with increase to 1600 miles at 160 miles per hr. by addition of external fuel tanks.

Other features include a hydraulically controlled retractable undercarriage, fitted flaps, transparent perspex cockpit cover and a single fin and rudder. Dimensions: Span, 39.4 ft.; length, 28.4 ft.; height, 9 ft.; wing area, 256 sq. ft. Reports from other sources indicate that the craft uses countersunk rivets, throughout, and the wings are integral with the fuselage.

Plastics in Aircraft Tooling

... The time consumed in making jigs and fixtures can often be sharply reduced by the substitution of cast plastics for steel, dural and wood. The new process also saves time and cuts costs in the fabrication of duplicate tools.

THE anticipated shortage of metals prompted a recent investigation of the possibility of using plastics for tooling in aircraft. As a result of this investigation, the Lockheed and Vega aircraft corporations in the past few months have begun producing tools made of plastics, both for drill jigs and forming dies that will stand up to 8000-lb. pressure per sq. in. under the hydraulic presses.

This investigation was started by M. Basolo, foreman of the Lockheed wood shop, and has been carried forward along slightly different lines at Vega by Carl Hill of plastic tool development.

Drill jigs can be fabricated by securing the drill bushings to the master part, placing the part in a form, and pouring a molding of material around it. When the material has solidified in conformity to the contour of the part, the bolts holding the bushings in position can be removed, and the jig then finished for use.

The present method of drill jig construction, using wood with inserted metal bushings, has several disadvantages:

(1). The operations involved in creating a three-dimensional contour in wood are largely manual and hence slow and expensive.

(2). Bushings must often be retained by steel nests or straps. This

creates a layout problem which adds to the time and expense involved, and requires the extensive use of machine tools.

(3). The wood is adversely affected by moisture and soluble lubricating oils, and may swell or shrink unless it receives surface treatment and periodic maintenance.

Requirements for a satisfactory thermo-plastic material are that the material be of such a nature that it:

Can be cast at 225 to 325 deg. F. with a minimum softening point of 200 deg. F. (These requirements make it possible to cast the jig in an aluminum alloy part without damaging the latter; and will avoid danger of softening of the jig due to heat generated by drilling).

Can be reclaimed cheaply.

Can be finished on standard wood working tools.

Has sufficient impact strength to withstand shop handling.

Does not exhibit brittleness at low temperatures or after aging.

Is resistant to lubricating oils and metallic chips formed in the drilling operation.

In addition, means for controlling shrink of the molding material should be available.

Of several materials studied, Lockheed accepted a phenol acetone thermo-plastic, while Vega at present is using an acid-setting phenol formaldehyde thermo-setting composition which contains 25 to 30 per cent ground walnut shell flour as a filler, with resin and an acid catalyst or accelerator. Other good fillers include wood flour, Masonite and scrap plastic.

Among the outstanding features of plastic tooling are the following:

(1). Plastics may be substituted for steel and dural in many cases.

(2). Tools may be cast to a master part or plaster mold more quickly than by forming, milling or hand fitting.

(3). Duplicate tools may be fabricated at less cost than the original due to the fact that molds are saved.

(4). Duplicate tools may be made economically and quickly for transportation to other plants.

It is believed at Vega that the portion of their tooling program

on the B-17F Flying Fortress which has been completed through the use of plastics, involving three months' work, would have required five to six months if wood, dural and steel had been used.

Another important feature is that if templates or engineering data are not available, but a master part is at hand, then not only is time saved in making the actual tool, but there is eliminated the time necessary to obtain this information and to make the templates.

Vega has found that plastics are applicable to drill jigs, formed

ity of their becoming overheated and losing their location.

These bushings, incidentally, are more quickly manufactured because of the fact that only the inside diameter is vital. On one drill jig there was a saving of over \$70 in the cost of bushings alone.

Router blocks, shaper blocks, and saw jigs made of plastics have two particular points in their favor. One is that they can be cast to a contour. The other is their natural resistance to the soluble oils used in the fabrication of parts. They do not warp or lose tolerance because of moisture absorption.

Definite mold lines will always be maintained, as long as about 8000 lb. per sq. in. pressure is not exceeded. The only impact requirements of plastics are that the material withstand dropping to the concrete floor and normal impact incurred in loading and unloading the jig or press.

The type of part to which this process is best suited is an open contour, with or without joggles. The equipment required for making the plastic drill jigs of the material used by Lockheed consists of a jacketed kettle equipped with a full scraper type agitator. The

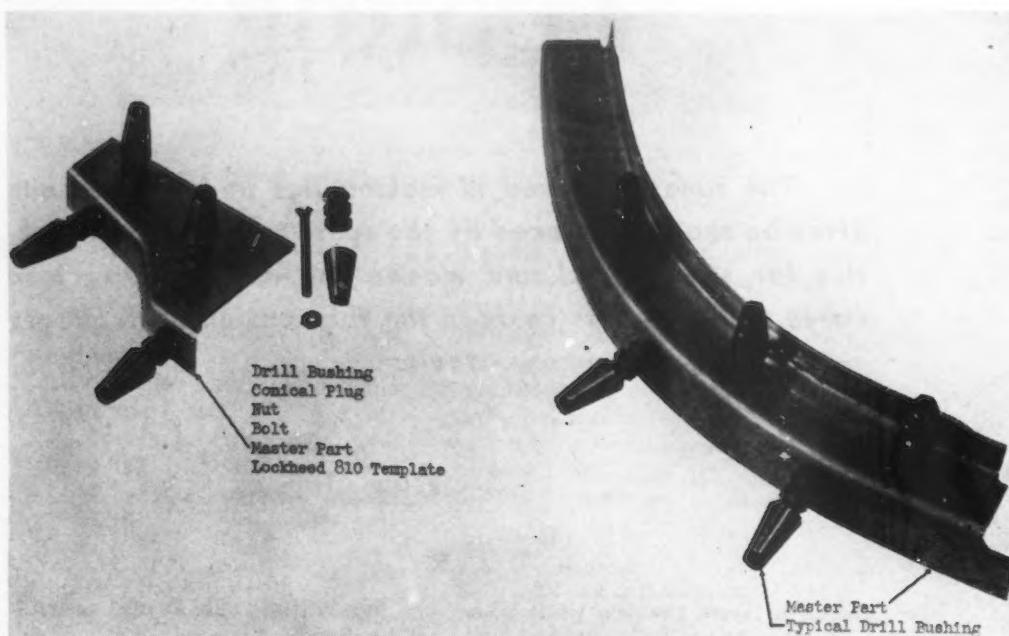


FIG. 1—Master part templates around which plastic is poured in making the new type drill jigs. When the plastic has set, the cone-like plugs are removed to indicate the positions of the drill bushings.

router blocks, shaper blocks, saw jigs, checking fixtures, hydraulic press form blocks, dies, punch jigs, forming dies for Plexiglass; in other words, most jigs that involve contours. They have no particular advantage on jigs where no contour is involved, except from the standpoint of conserving vital materials.

It is not possible to cast bushings directly in plastic drill jig plates. Locating the bushings, however, is accomplished quickly and efficiently by casting Cerromatrix at 300 deg. F. around the bushings which, in turn, are located to the master part or template by means of pins—oversize holes having been drilled in the plastic plate to accommodate the bushing and Cerromatrix. These bushings are especially designed for thermoplastics and are of sufficient wall thickness to eliminate the possibil-

With the addition of the acid catalyst to the base resin, Vega is now able to set up and finish the average work in plastics in eight hours—work that may take from three days to two weeks by former methods.

For hydraulic press production tools, where a minimum of 1½ in. draw can be maintained, applying external beads as stiffeners around lightning holes in flat work, the application of plastic tooling can help speed up production by using two or more duplicate tools which are cheap to manufacture and light to handle. The development work can be done with a wood form block, and a plaster split mold can be made to this wood form block. In this manner, duplicate tools may be cast in plastics, the plaster split mold always being saved in event of breakdowns due to rough usage in production.

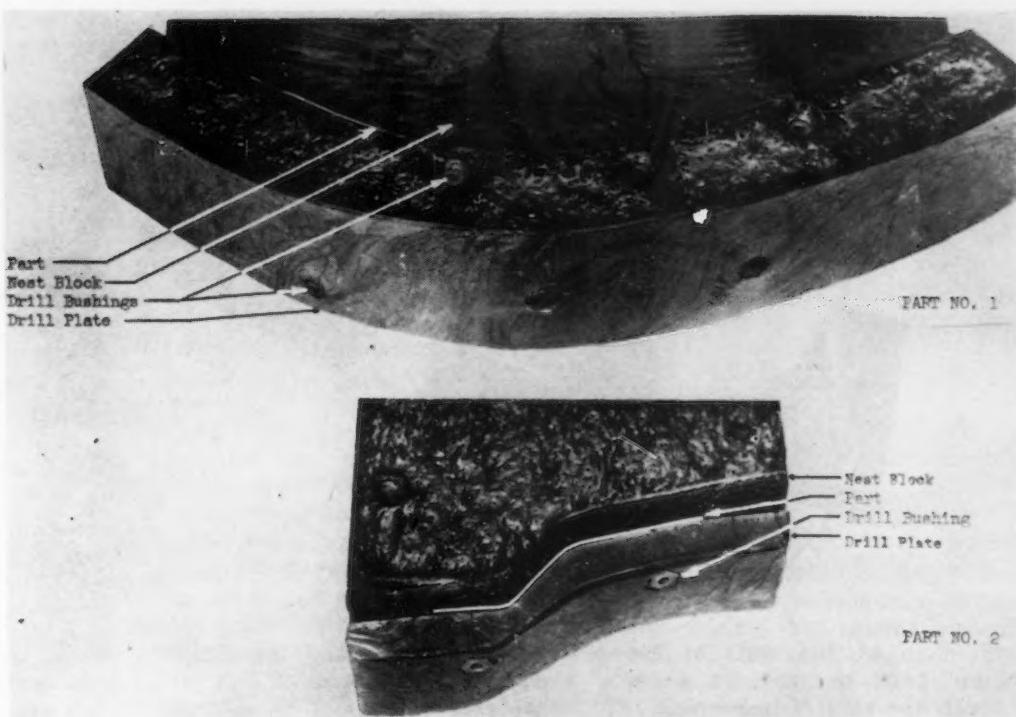
jacket contains a liquid bath, heated to maintain the desired temperature throughout the kettle.

At Vega, the thermo-setting composition is mixed in an ordinary baker's bread mixer and then baked at 175 deg. F. in a cookie oven.

Lockheed Technique

Molded drill jigs are fabricated from master part templates containing master co-ordination holes (Fig. 1). Drill bushings are bolted through these holes to the template. This assembly is then placed in a retaining form and the plastic material is cast over the part and around the drill bushings. Shrinkage is controlled by having the retaining form extend above the master part. Hence when the hot plastic first contacts the cold part, it solidifies rather rapidly, freezing to the contour. As the remaining plastic mass progressively

FIG. 2—To complete the drill jig the part is placed between the drill plate and the next block, the assembly is clamped together, and holes are drilled to accommodate the alinement bushings.



solidifies, plastic is supplied from the reservoir created by the retainer, terminating in a sunken surface on top.

When the cast is cool, the retaining forms are removed and the concave free surface of the block is finished on the joiner until flat. Here the cone-like plugs (Fig. 1) are first removed, making the position of the drill bushings visible. A certain amount of care must be exercised at this point to prevent the joiner blades from

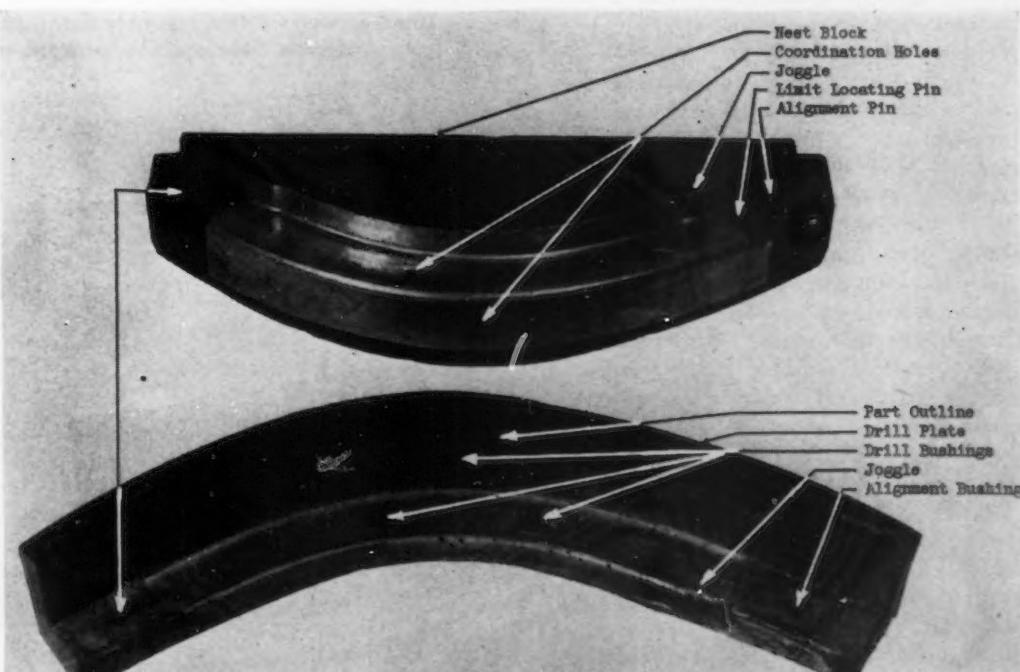
striking the drill bushings. In practice the plastic is cut to within $\frac{1}{4}$ to $\frac{3}{16}$ in. of the external drill bushing face and the hole to the drill bushing is chamfered as a finishing operation.

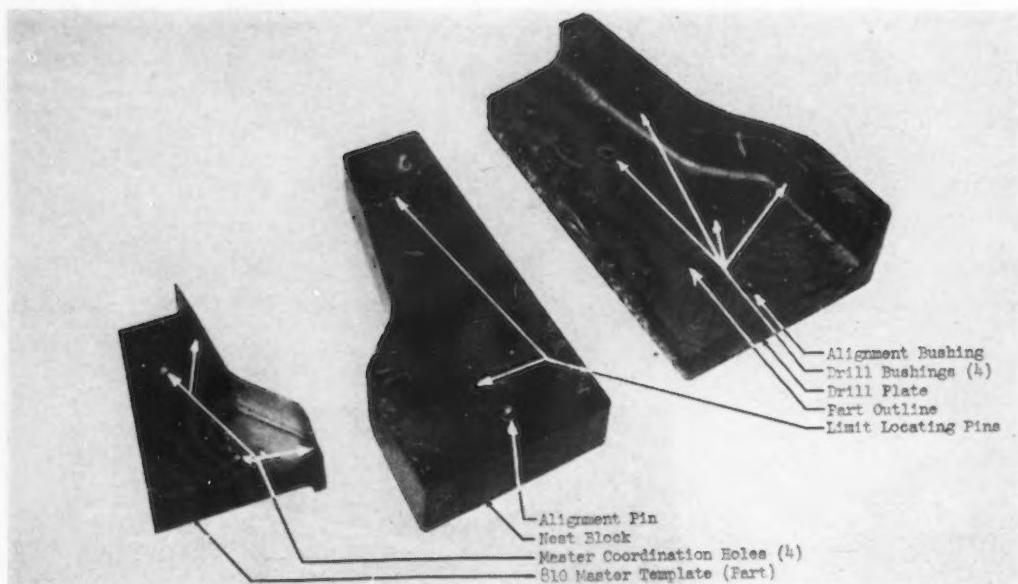
To complete the jig, the part is placed between the drill plate and the next block (Fig. 2) and the assembly clamped together. The alinement of the co-ordination holes in the part and the drill plate is checked with the proper sized drill rod, and $\frac{3}{8}$ in. holes are drilled

through the ends of the assembled jig to accommodate the alinement bushing, (Fig. 3). The jig is then unclamped. The alinement bushings which are serrated about their outer circumference, hold securely when driven into place. The alinement pins are then driven into the alinement bushings in the drill plate and held in place by heating a small amount of the plastic and flowing it into holes on the back of the drill plate.

Limit pins are driven into the

FIG. 3—Open jig and part, showing position of the alinement bushings on either end of the assembly. This is the part shown at the right in Fig. 1.





LEFT
FIG. 4—Open drill jig.
The template at the left in this illustration is the same as that which appears to the left in Fig. 1.

drill plate at the ends of the master part, or may be placed through the part if it happens to contain pin holes used to locate the part during forming.

In jigs of phenol acetone resin the position of drill bushings may be altered by inserting a torch-heated drill rod in the bushing, allowing the heat to diffuse momentarily, and applying a force in the desired direction of movement. This will facilitate any alterations required by inspection.

If the part from which the drill jig is cast is extremely large, an alternative method of affixing the drill bushings is available. First the drill plate and next block are cast as outlined above, except that the drill bushings are not bolted to the master part. When the drill plate has been planed to the lengths of the drill bushing, the master part is nested and holes backdrilled through the template and drill plate. Using the pilot holes, enlarged to a diameter of 1 in., the drill bushings are affixed to the master part, nested into the drill plate and clamped. Plastic is then poured around the bushings to bond them to the drill plate. The bushings are disassembled from the master part and finished as described in the preceding method.

Vega Technique

There are two methods by which molds can be made. One is to back up the part with clay or plaster and build the sides of the mold around the part, extending the flanges with plaster to allow a larger base

or nesting block than the sample part itself.

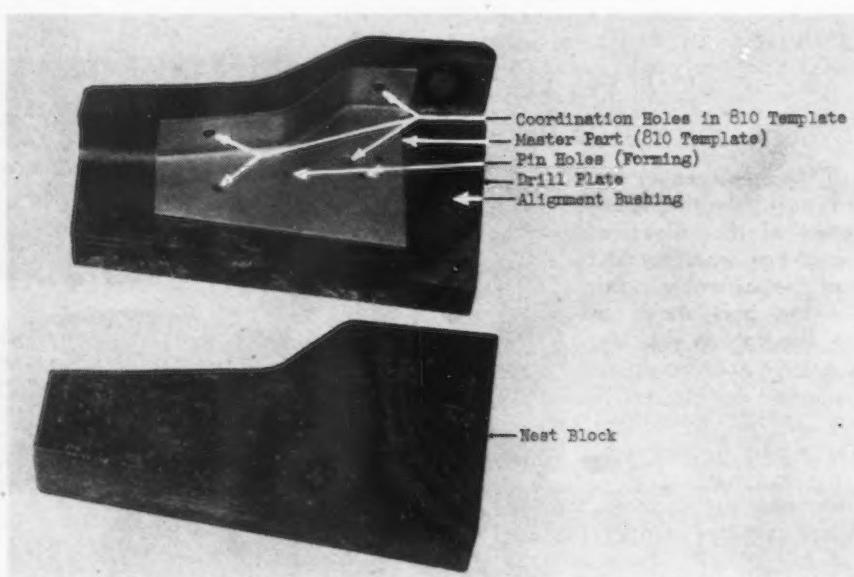
Another method is to use the sample part as a pattern and make a complete mold from the part. On large castings it is often advisable to use the plaster from which the Kirksite die was made to obtain the contour. When this is done, a splash is made of the plaster, and the sides are built up of wood.

It is better to use wood for the outside of molds whenever possible, because wood contains far less moisture than plaster and allows rapid penetration of heat. This insures a cured casting. In many cases the surface that is to be next to the part can be cast on plaster

while the outer surfaces can be cast against wood and later sanded.

If plaster is to be used entirely for the mold, the volume of plaster should never exceed the volume of the casting. Mold thickness should always be kept to a minimum. The reason is best explained by the action that takes place. When the reaction between the resin and the catalyst takes place, heat is created. The more volume in the casting the more heat is formed. Thus, in a small casting, only a small amount of heat is created, and the casting is forced to depend on oven heat to finish its cure. If a small casting is encased in a thick plaster mold, it takes oven heat some time to penetrate the plaster. Thus, in

FIG. 5—Another view of the assembly illustrated in Fig. 4 shows the drill jig in the open position, with the part in place.



many cases, in order to cure the bottom of the casting, it would have to bake so long that the top, which is exposed, would be overcured.

Molds of any material should be made in such a manner that they can be easily sprayed and then assembled and poured.

Treating the Molds

All plaster molds should be treated with one coat of Bayberry wax, let dry and sprayed with at least four coats of clear lacquer, sanding between the last two coats. The lacquer must be thoroughly dry before pouring the plastic.

Wood molds should be coated with four coats of clear lacquer, sanding after the first one. The last coat should be absolutely smooth. Regardless of the material used in the mold, the casting will reflect every detail of the mold surface.

Drill Jigs

The above procedure outlined for molds holds true for all types of jigs. Drill jig bases fall in the same category as formed router block bases. In many cases it is desirable to use plastic bases and some other form of drill plate.

• • •

SEARCHLIGHT REDESIGNED: Production of this Air Corps searchlight is now running at the rate of hundreds a month, contrasted with a peacetime output of less than 200 a year. Many of its principal parts — now steel stampings — were formerly aluminum castings, presumably because quantities did not justify the stamping die cost. Despite the substitution of a material of greater unit weight, the new design effects a saving of 700 lb. of aluminum on each light. The head for this searchlight dome, which is 70 in. in diameter before trimming, is now made of 13 gage steel, replacing a $\frac{3}{8}$ -in. thick aluminum casting. It is formed in an 800-ton automotive body press by the Murray Corp. of America, which redesigned the unit for General Electric. Additional steel stampings include the shroud, yoke, azimuth control housings and other housings. A few malleable iron castings are also incorporated in the new design.

• • •

Weight is an essential factor in all tools. Bases should not be under $\frac{1}{2}$ in. or over $2\frac{1}{2}$ in. thick. On extreme contours, the bases should be made in the form of a shell. Bases should always be backed up with $\frac{1}{2}$ in. Masonite to absorb the jar in handling and protect the edges. In cases of a shell for a base, the shell may be fastened to the base at points of contact.

No design for plastics should include sharp corners or protruding angles or flanges that may be knocked off or chipped in use. All radii should be as large as is permissible on the particular tool. Outside radii that have no bearing on the function of the tool should be at least $\frac{3}{8}$ in.

Wall thickness should always be $\frac{3}{4}$ in. or more. Drill plates that are poured with a constant wall thickness should be poured from one end, baked and left in the mold to cool. Thin sections poured from the flat side will warp.

Any standard type of hold-downs may be used, always bearing in mind the fact that when the clamps are closed or tight, the plate should be resting solidly against the base and yet not have the drill plate in a strain.

Plastic hexagon bushings are

available and are recommended where space is not cramped. In the event that space is limited, gang bushings are recommended.

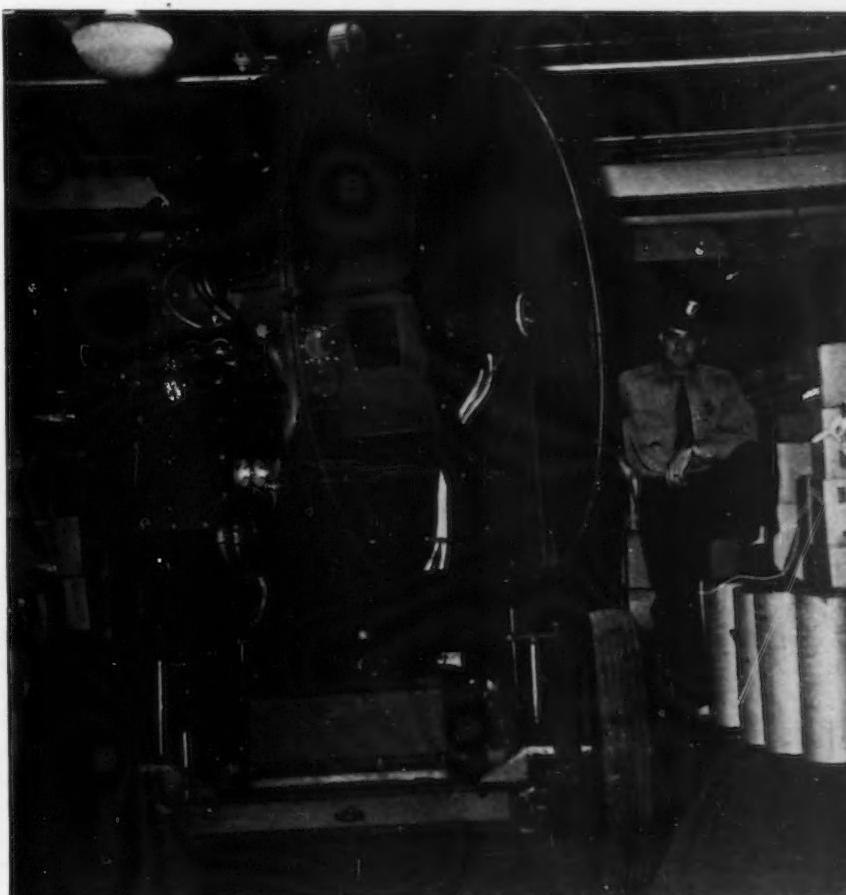
Plastic Form Blocks

All plastic press form blocks should be mounted on a Masonite base projecting all around the block $\frac{1}{2}$ in. On blocks that are to be 2 in. high the plastic should be poured $1\frac{1}{2}$ in. thick. On thicker blocks, 1-in. Masonite should be used. Blocks should be standard 2, 3 and 4 in.

If a wood pattern is made, it should be made to shrink scale. The shrink of the oil tool resin now being used is $1/10$ in. to the foot. A plaster splash is made of this pattern and the splash used as a mold.

The actual technique of mixing and curing the resins depends primarily on the compounds selected, and can best be determined by consultation with the plastic materials supplier.

It should be understood that plastic tools are not suggested as a cure-all. Much depends on the tool itself and its application, and a great deal of thought must go into their design, and into training of personnel in their manufacture and use.



Famous "Tommy" Gun

THE Tommy gun was invented in 1920 by Comm. John Blish of the United States Navy and Brig. Gen. John G. Thompson of the United States Army. Colt's Patent Fire Arms Co. built the first 15,000 for stock back in 1921. Although the weapon was sold all over the world, it did not become a standard arm in our own forces until 1928. Between 1921 and 1939 there was no further production, but in the latter year, fresh capital was brought in and Savage Arms Co. was given a subcontract to produce a limited number of Tommy guns. ("How Savage Arms Makes the Browning Machine Gun," THE IRON AGE, March 12, 1942.) The site for the present New England plant of the rejuvenated Auto-Ordnance Corp. was acquired in August, 1940. The buildings had been previously used for the manufacture of brake linings and represented just so much floor space in not too good condition. The plant was renovated inside and out, new floors put in, power lines installed and plumbing repaired. It was January, 1941, before even the engineering department could move in, much less consider any manufacturing.

The original manufacturing set-up entailed making only the larger components of the gun and jobbing out or subcontracting all small parts as well as the assembly operations. The first guns were completed on this basis in August, 1941. Since then, more and more components have been pulled back into the plant and assembly operations are completed here as well. At the same time, from month to month, the sights have been raised on daily output, which by this summer will be six times what it was originally set for. But because an increasingly larger number of parts are being made by the prime contractor the total man-hours of productive labor will have been increased 20 times within a year.

Fortunately for the organization, certain manufacturing policies had been established in the beginning that have been of great help in

furthering this tremendous acceleration in production. One factor was the extensive use of second-hand machinery. The company could never have got going as fast as it did if it had had to rely on the delivery of brand new equipment, even with its high priority rating. Of present equipment, about 75 per cent was purchased through second-hand machinery dealers. Many of these machine tools were bought "rebuilt and guaranteed," but the bulk of them were rebuilt right in the machine repair department, one of the first departments to be set up. One such machine, a Pratt & Whitney profiler, illustrated, dates back to the Civil War, but except for the fact that it takes up an inordinate amount of floor space, in its rebuilt condition it does just as satisfactory a job as its modern counterpart, for both machines are hand feed types. Many other P. & W. profilers and automatic milling machines, dating back to World War I, are also in use. Some of the older types of machines, too, were leased from the Springfield and Rock Island Arsenals of the U. S. Ordnance Department. All the old equipment, either leased or purchased, has been given independent motor drive, frequently in conjunction with selective speed transmissions.

The second important factor was that from the start the company decided to make all its own tools, fixtures, jigs, cutters and gages—that is, all with the exception of standard drills, reamers and hacksaw blades. The management foresaw to a large extent the critical shortages of cutting tools and gages that would occur as the defense effort advanced and proceeded to make themselves independent of market conditions, relying upon their A-1-a priority to get the necessary tool steels and high speed steel. To a large extent the decision was influenced by the fact that the company had control of a small tool shop making a

special form of lathe tool (spring tool holders) and still continues this as a separate manufacturing and sales activity of the parent company.

The activity began therefore first with the ordering of new machinery and the procurement of old, the design of tools, fixtures and gages, manufacture of these elements as soon as the designs were approved, and finally with gun making. For six months, the company built nothing but tools and gages. The tool engineering function comes under the chief engineer whose duties in regard to product design are secondary since the weapon has been largely standardized. If changes in design eventually are warranted, the result will be an entirely new weapon—not piecemeal changes in the current model. (Witness the Garand rifle as against the old Springfield rifle.) Building of tools, fixtures and gages comes under the direction of a tool superintendent. Heat treatment of both tools and product comes under another department head, although the equipment is kept segregated in adjacent shops.

It should be explained that three classes of machine operations predominate in this plant. Heading the list is milling, then comes profiling (which is a specialized form of vertical end milling) and drilling. These are the big tool users. Many of the other operations like surface grinding, filing, burring and polishing require no tools as such. Slab mills, end mills, profile cutters and formed cutters of all sorts are encountered in manufacture of gun parts. A few press tools are used to replace what would ordinarily be milling operations and a few stampings are replacing milled parts. Shaving is another operation common to gun shops. It is a form of slotting.

The greatest amount of labor in the toolroom is devoted to the manufacture of milling cutters. Much

Made by Self-Contained Plant

of the equipment here is second-hand but has been modernized by the addition of motorized speed reducers as in the example of the production machinery. Several saddle type milling machines have been made more universal by the adoption of small motorized milling heads that can be tilted at any angle about the over-arm support. A great deal of work, particularly in gashing milling cutter blanks is done with indexing or dividing heads. Getting these heads in a hurry proved to be a temporary bottleneck, but it was eventually overcome.

Several lathes, both bench and floor type, have been equipped with backing-off attachments for relieving form milling cutter teeth.

Complete facilities are available for grinding all types of milling cutters—mostly with small cup wheels on universal types of grinders. These cutters include plain cutters, helical slab mills, end mills and formed cutters sometimes ganged up with plain cutters. Some of these formed cutters are first given a relieving operation on the

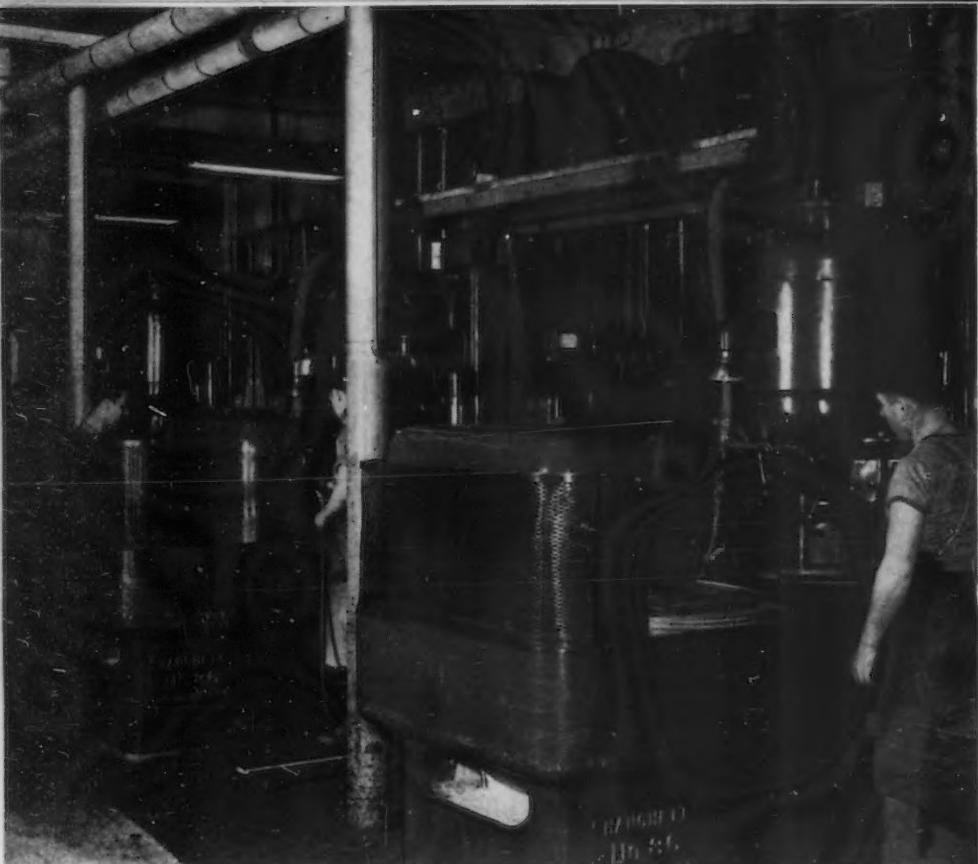
... One of the best known weapons in use in the present war is the Thompson submachine gun, familiarly known as the "Tommy" gun. Practically every armed force in the world has used this rapid-fire, short range small arm in the past 20 years. Today it is being produced in ever increasing quantities for use by mechanized land forces and marine and naval landing parties of the United Nations. Light in weight (9 lb. 13 oz.), it delivers a devastating fire with cal. 0.45 pistol ball cartridges from magazines holding 20, 30 or 50.

top of the form and thereafter are sharpened by grinding back on the face with a shallow dished wheel. Other cutters are profile ground on the periphery of the cutting edge on a Barnes type machine. With this type of unit, the cutter or cutters are ganged up on an arbor mounted on a movable jig plate with template on the base. The template is brought to bear against a former pin fixed on the flat table below the

wheel. The wheel is diamond dressed to the same radius as the pin and grinds each tooth in conformity with the template. Side teeth are ground with the same clearance as the others. This type of machine was largely developed for the small arms industry in the last war.

The gage making department is separate from the tool shop, though adjacent to it. Much of the equip-





MANY gun parts are milled from square or flat, hot rolled alloy steel bar stock. After being sawed to desired length, the slugs have the four main surfaces ground to size and squared up in this battery of vertical surface grinders, not all of which are shown. Motor-generator sets for supplying d.c. to the magnetic chucks may be seen on the ceiling platform.

ment here is new, including a thread grinder and a battery of small surface grinders. Many of the inspection gages made here are of the jig type, and incorporate two or three flush pin plugs to check the relationship of various surfaces on odd-shaped pieces. All kinds of Go and Not Go snap gages are made up. There are complete facilities for checking gages, including protection apparatus.

Gage Control

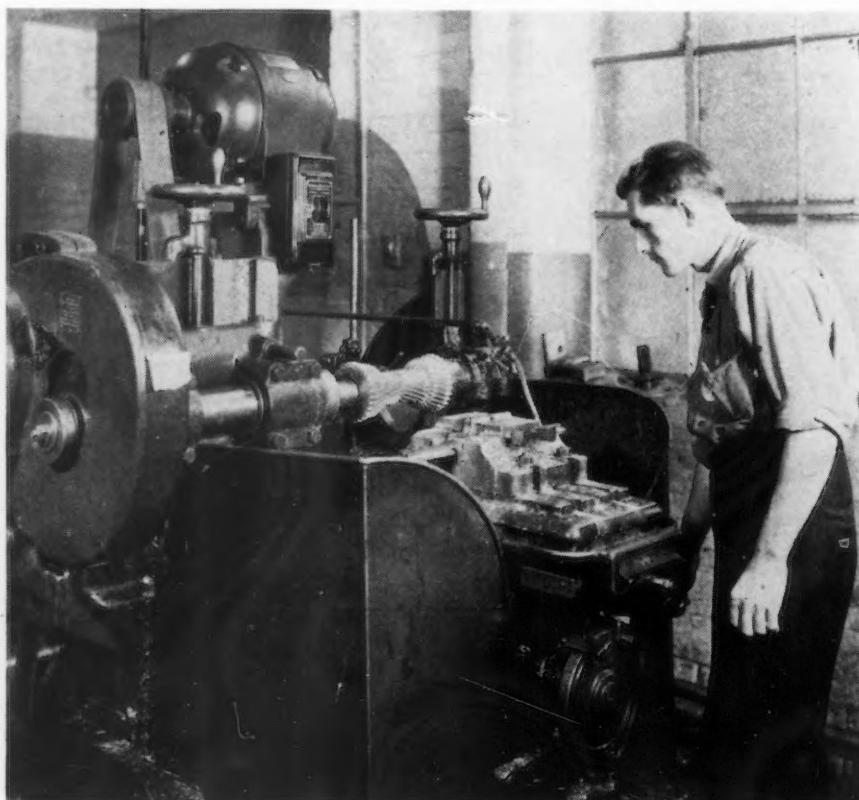
Gage control is exceedingly important in a plant such as this one, manufacturing interchangeable parts. A separate department has been set up to control gages and gage tolerances have been established independently, although necessarily in line with government standards. As experience is built up in actual inspection work, the frequency with which working gages are brought into the gage laboratory for recheck is revised from time to time. Obviously, some gages wear rapidly and others last much longer, depending upon the application and gage tolerance.

As on all government ordnance work, the unilateral system of gage tolerances is followed, that is, the limits on the work encompass all gage tolerances. In other words,

all high limit gage tolerances are negative and all low limit gage tolerances are positive. The gage tolerance for a "Not Go" plug is always taken on the negative side, for example, and on a "Not Go" ring gage on the positive side. In commercial work the tolerance zone on the gage more often is centered about the upper or lower limit on the work. Ordnance engineers contend that the unilateral system is more scientific than the commercial, bilateral system and more positively assures the production of interchangeable parts.

Aside from process inspection throughout the plant, there is a final inspection area under a different head to assure interchangeability of parts. This final inspection is independent of U. S. Ordnance inspection, which gives a further check. Both plant inspection supervisors report to the production managers. Incidentally, the supervisor of the tool and gage department reports directly to the works manager and as far as the production department is concerned this tool department acts as an

ALTHOUGH these P. & W. automatic millers have been out of production for 25 years, the builders of the Thompson submachine gun were able to pick up large numbers of them through used machinery dealers. Ideally suited for small arms manufacture, they have a short table stroke with automatic feed and a slight cam drop at the end of the feed, so that the work clears the cutters on the rapid return stroke. In their reconditioned form these machines produce as accurate work as a modern manufacturing type miller. Note the modern motor drive.





THE sine qua non of gun manufacture is the profile miller. This is the latest type, a double spindle machine with hand control of the in-feed of the table and cross-feed of the heads on the rail.

outside supplier. Final inspection of the product after assembly includes proof firing to test for proper functioning of the gun and a test for accuracy of fire in a machine mount.

100 Per Cent Interchangeability

It should be noted that the Thompson submachine gun is a 100 per cent interchangeable weapon in order that it can be readily serviced in the field from spare parts. There are no selective fits except between the two main components, the frame and the receiver. Actually these two parts are chosen at random but once mated are identified with the same serial number because certain outside surfaces are blended into one another on glue bonded abrasive wheels, purely for appearance sake. Actually, the mating fits on these parts are interchangeable rather than selective.

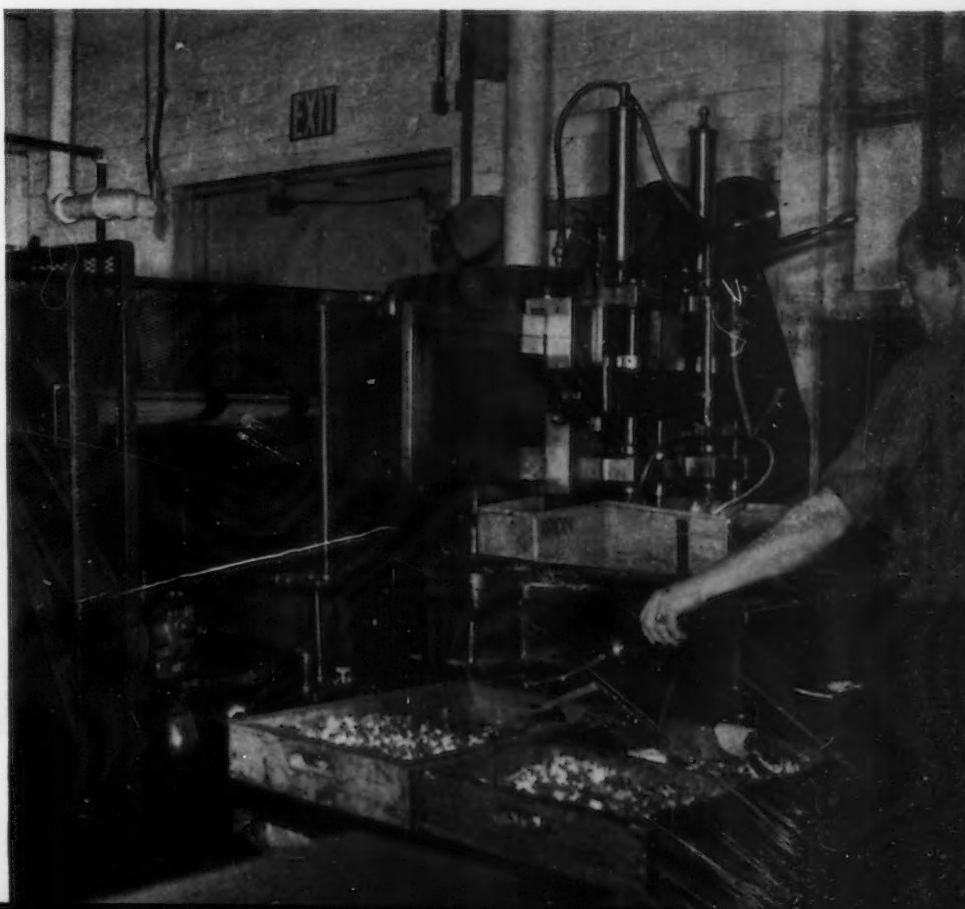
It can be readily seen that gage manufacture is a continuous manufacturing problem. Inspection gages are in a class with perishable tools and must be progressively

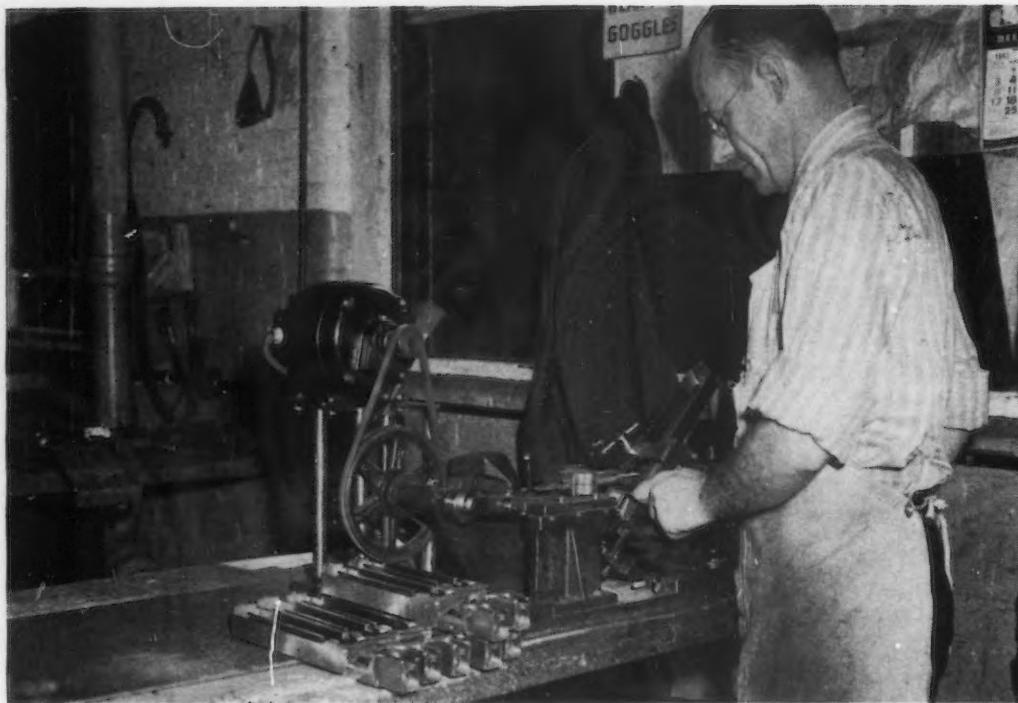
replaced as they wear below or above the gage tolerances set. As has been indicated, the reorganized company began operations by building its own tools and gages. Obviously in the terrific acceleration in production in the last year, this tool and gage department has been expanded in step with expanded production facilities—in fact, even faster. As a result, the company has been able to keep not only itself but most of its sub-contractors supplied with these vital items. Like the rest of the plant, the tool and gage department is working two 11-hr. shifts, and there are now 20 per cent of all hourly rate workers in this department—an extremely high ratio compared with commercial activity. The officials believe however that this service force can be kept occupied full blast on replacement of tools and gages. If not, there is its established line of spring tool holders to fall back upon.

It should also be mentioned that the company makes all its own milling machine vises, which are a cam lock type somewhat similar to the Colt cam lock vise.

As far as the shop organization is concerned, it is going through a gradual metamorphosis—in reverse, it would appear at first

THOUGH it takes up considerably more floor space than its modern counterpart, this P. & W. profiler miller which first saw service in producing rifles during the Civil War is still doing a fast and accurate job today. In this machine the spindle belts travel along the driving drum in the rear as the heads are rocked back and forth. V-belt drive from a motor and belted coolant pump are the only modern additions





DEAD end angular slot in the receiver being filed in a homemade, power driven filer. Work is held at proper angle in a fixture which can be indexed from one side of the receiver to the other. The operator is shown checking the slot width with a Go and Not Go gage.

glance. As of April, 1942, the shop was arranged largely on a line production basis, except for the initial processing of raw material, heat treating and polishing and burring operations. These functions were departmentalized. Otherwise the various floors were laid out by components, with complete facilities in one area for doing all operations necessary to complete those parts, except heat treating and finishing. In one department, you would find manufacturing millers, vertical millers, profilers,

shaving machines (a modification of a slotter, either horizontal or vertical) and numerous drilling and tapping machines.

Balancing Production Facilities

On the other hand, because some operations take only 15 sec. while others may take as long as 20 min., it is extremely difficult to obtain anywhere near a balance in production facilities. Hence many of the short operation machines may be idle a great deal of the time in a line production set-up, although

the operator might be kept busy running another machine assigned to him. With real estate the limiting factor in expansion, the management has been faced with the problem of making most effective use of available floor space. The solution will be to adopt, with a few exceptions, a departmentalized set-up—all milling operations in one department, profiling in another, etc. The short jobs can be done on a small battery of machines that will be operated full time. One exception will be the



IN the small arms industry, this machine is called a shaver. A special form of vertical slotter or shaper (there is a horizontal type also) this machine carries a fishtail bit on a reciprocating ram. Feed of the table is in two directions at right angles, controlled by hand-wheels, one of which is shown. Fixture holds work (the receiver) at an angle for this particular operation. This is the same slot shown being filed in another photograph.



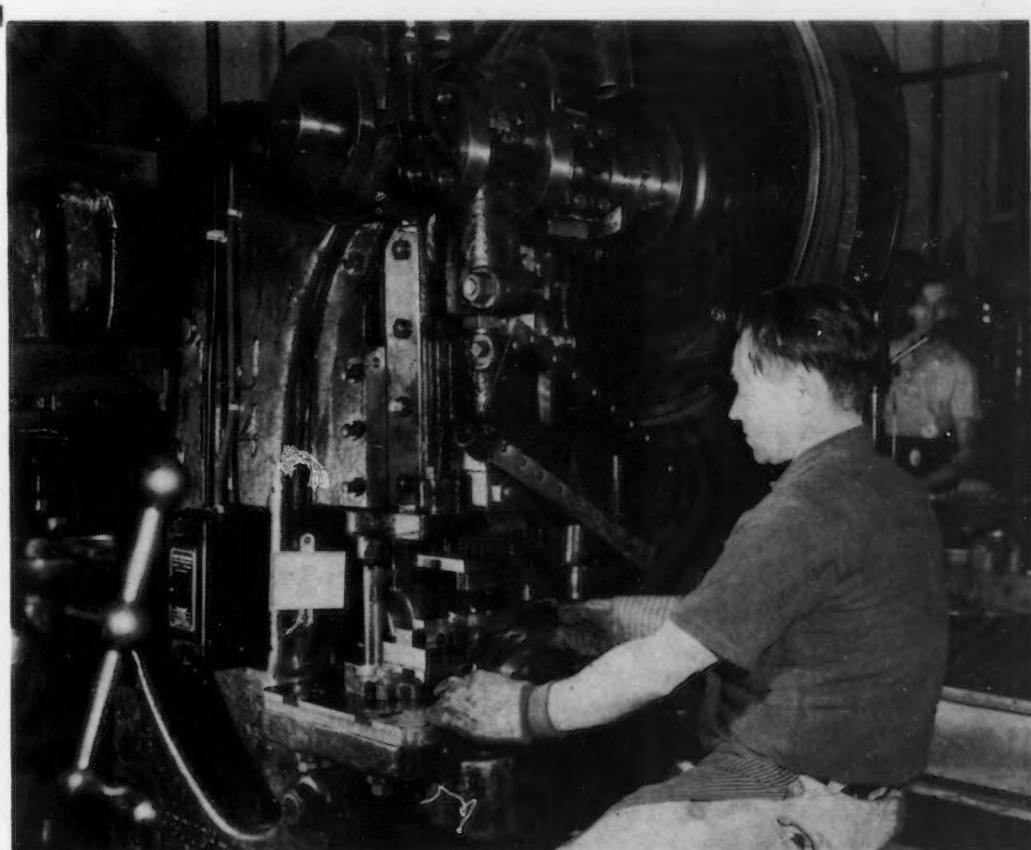
BURRING operations are largely done on this battery of buffing stands, using abrasive grit set up in glue on cloth or wood wheels. The operator is shown breaking the edges on the receiver.

gun barrel department which is now being set up. (Barrel work was formerly jobbed out.) Here all turning, drilling, reaming, and rifling operations will be done in one area.

An interesting phase of this type of manufacture is that most parts are finished machined before heat treatment. The only operation fol-

lowing heat treatment is sandblasting to remove scale and to give a matt surface so that the chemical blackening treatment will produce a dull, non-reflecting surface. Hence it is highly important that hardened parts be kept free of distortion. No attempt is made to use quenching presses when the work is withdrawn from the salt baths,

but for the drawing operation that follows, the work is clamped in a frame under pressure supplied by two bolts. In the example of frames and receivers (the two main body pieces) six are clamped in a frame in three pairs. Tension on the bolts is limited by their stripping the threads and the operators soon learn how heavily they can



THIS punch press operation on the top of the receiver replaces a former end milling operation. The sharp edges left by the punch are subsequently rounded in a profiler.

lean on the wrenches. At the drawing temperatures, any distortion that occurred at the hardening heat or in quenching is rectified.

Hand Filing Minimized

Hand filing and burring operations have always been a problem in small arms manufacture. A few years ago, one of the leading New

belt sanded. Edges of the trigger guard in the main frame of the gun are rounded with an abrasive belt on a home-made machine. By releasing the spring tension on the idler pulley by action of a treadle, the belt can be unslung, threaded through the eye of the trigger guard and slipped on the idler again. This is a standard opera-

The only grinding done for control of size, outside the tool and gage department, is on the receiver. The principal raw materials are forgings and square or rectangular, hot rolled bar stock. Forgings go directly to the milling machines. The bar stock is first cut to length in a battery of power hacksaws and then is trued up on its four principal sides on vertical spindle surface grinders, pictured. After two opposite sides are ground parallel and within 0.003 in. of size on the rotary magnetic chucks, the pieces are mounted in fixtures and the two other sides squared up, gripping by the previously finished faces. This is an operation not ordinarily found in commercial practice, but one that assures accuracy in all subsequent milling, drilling, profiling and punching operations.

Punching operations are not ordinarily associated with parts cut from heavy, bar stock or from solid forgings. On a part like the receiver, for example, though it starts out as solid bar stock, by the time it has been drilled, slotted, end milled and profiled, it is a mere "hollow shell" of its former self. As a result it is possible to punch out a fairly sizable slug to produce the slot through which the bolt knob protrudes and slides in the finished weapon. A hole is first drilled at one end. The punch press operation takes but a few seconds and the only subsequent operation is to round the edges of the slot in a profiler.

On other components, a rectangular hole is punched out in a power press. Previously the part was first drilled, then milled and finally shaved or slotted to produce the square corners.

In closing, it should be mentioned that this particular organization was built up around production-minded men drawn from outside the New England small arms industry. Hence the tendency has been to scrap traditional gun manufacturing methods whenever there was a chance to cut a corner and save time. The use of stamping operations is a good example. The operating personnel has also come in without any preconceived notions and has been trained in the new ways. As a result this is a war industry that is really "going to town."



THIS old cone head miller has been modernized by the addition of an electric motor V-belted to a four-speed transmission unit—a typical example of how old equipment can be made to serve in the present emergency in the production of vital ordnance items.

England gun makers set up a special training school for hand filers alone. Much of the filing or burring is done to remove sharp edges and blend radii. In this particular plant under discussion, hand filing has been reduced to a minimum. Tumbling in barrels is used to break sharp corners on small parts. Small disk sanders are also employed. But mostly burring, polishing and blending of surfaces are done on abrasive wheels set up with glue. For one job, an air inflated wheel is used to follow irregular contours. Some flat surfaces are

tion in finishing the finger holes in the handles of a pair of scissors.

Blending of the outside surfaces of the frame and receiver is also done on abrasive wheels. In this operation substantial amounts of metal are removed.

A few filing operations have been mechanized. These are essentially short broaching operations and the purpose of mechanically reciprocating the file is to assure a straight surface and eliminate the tendency to produce a camber when the work is done by hand. This home-made device is pictured.

Metallurgy of the Mitsubishi Engine

A STUDY of a 14-cylinder Japanese engine by the Air Corps, Wright Field, and the Wright Aeronautical Corp., Cincinnati, reveals some interesting data on the material entering into its construction, according to W. G. Ovens, in a paper presented at a meeting sponsored jointly by the SAE Detroit Section and the Engineering Society of Detroit. Some of the materials used in the Kinsei engine indicate that, at least at the time the engine was built, the Japanese had adequate supplies of nickel, cadmium, chromium, cobalt, copper, molybdenum and tungsten.

The only magnesium alloy found varies somewhat from American standard alloys in that it contains 4.6 per cent aluminum, 2.6 per cent zinc and 0.28 per cent manganese in addition to magnesium. It will be noted that this is similar to AMS 4424 except that the aluminum content is low.

In the aluminum alloys found, 17S is used for many parts such as main crankcase, tappet guides, piston pin plugs, etc. For special purposes such as pistons, cylinder heads and supercharger front housing an alloy containing 3.93 per cent copper, 1.37 per cent magnesium and 1.67 per cent nickel is used either cast or forged.

An all purpose steel, either case hardened or hardened throughout, is used for connecting rods, crankshaft, knuckle pins, valve rockers, reduction gears, etc. It contains approximately 1.5 per cent chromium, 3.5 to 4.5 per cent nickel, 0.3 to 0.4 per cent molybdenum, 0.35 to 0.5 per cent manganese and varying small quantities of tungsten, cobalt, silicon and copper apparently as impurities. It is suggested that this may well be a compromise for making the best possible use of the available scrap materials. What appears to be nearly the equivalent of AMS Specification 6254 is used in the propeller shaft and the starter and accessory drive shaft. The latter part is case hardened. In the propeller shaft it contains 3.86 Ni, 1.55 Cr, 0.47 Mn, 0.48 W, 0.35 Co, 0.19 Si, 0.2 C, and less than 0.05 each of Mo, S, and P. Magnetic inspection of all steel parts illustrated showed acceptable material. Nitriding is used only in the cylinder barrel. The steel

conforms very closely to AMS 6470. Nitride depth is 0.010 and 0.020 in. in two barrels cut. Core hardness varied from Rockwell "C" 22 to 34 in one specimen.

Plating is used quite extensively. Cadmium plating appears on the super-charger oil seal rings and most of the propeller shaft in addition to the more common points such as valve springs, valve rockers, push rods, and impeller shaft. Chromium plate is used on the under side of the inlet valve head and on upper piston compression ring outside diameters. Lead is used in the master rod bearing bore.

The material in the connecting rods is the all-purpose steel previously mentioned, hardened to Rockwell "C" 40. Master rod bearing is a heavy steel backed, copper-lead lined, shrunk-in bearing with a flange at one end. Steel is soft, 0.094 in. thick. Lining analysis corresponds to American practice with a small amount of tin and 1 per cent silver. The lining structure is good for medium loading. Bond and fracture examination were good; ductility, good; X-ray, good. Micro-examination shows good distribution but coarse structure with irregular dendrites in the cross section and shrinkage in the surface structure. Lining is 0.020 thick.

Articulated rods are tin-bronze bushed at each end. These are very good quality castings. The material is uniform and unusually free from foreign inclusions. Hardness is Rockwell "B" 70.

Cylinder construction is of nitrided steel barrel, aluminum alloy head type similar to American practice. Cylinder heads are cast of the aluminum alloy already described, and show a Brinell hardness number of 50.

The spark plug inserts are of aluminum bronze. Valve seat inserts are shrunk into the bores in the cylinder head, according to conventional practice. The steel exhaust insert is alloyed with nickel, chromium and quite high manganese with a Rockwell hardness of 87 "B". The intake insert is aluminum bronze, and tin-bronze valve guides are used in both intake and exhaust.

Pistons in this engine are aluminum-alloy forgings very similar to current American practice. A Brinell hardness of 100 is quite uniform. The piston pin is a low alloy steel hardened throughout to Rockwell "C" 42. It is not case hardened. The piston pin is retained by means of 17S aluminum-alloy plugs pressed into the pin.

The cam is a double track ring running on a tin-bronze cast bushing of very good quality which in turn is a push fit on a ledge of the crank case intermediate front section diaphragm. The cam is case hardened to Rockwell "C" 60, and the core hardness is Rockwell "C" 32.

Tappets are arranged in pairs in 14 17S aluminum-alloy tappet guides (one per cylinder). They are Rockwell "C" 61 throughout, although the photomicrographs show a change in structure near the surface. Push rods are low chrome-alloy steel tubing with pressed-in ball ends of low-alloy steel heat treated to a hardness of Rockwell "C" 30 except at the tip which is quenched to obtain a hardness of Rockwell "C" 60. Push rod housings are aluminum alloy attached by means of a packing gland type joint to the cylinder rocker box.

Valve rockers are cadmium plated steel forgings of the alloy already described. Hollow head and stem exhaust valves and the familiar "tulip" head solid stem intake valves are used. The exhaust valve is a high-chrome steel with stellite face and tip. It appears probable that the head is welded on and is of a slightly different material from that of the stem although this has not yet been definitely determined. Face and tip hardness is Rockwell "C" 56; stem, Rockwell "B" 96, and head, Rockwell "B" 93. Metallic sodium is used as a coolant. The inlet valve steel is high in chromium and tungsten plus 0.8 nickel. It has a hardness of Rockwell "C" 35 to 45 with the tip hardened to 55. Two springs are used per valve—the inner seating on a washer on the guide flange and the outer on a loose steel washer in the cylinder. Springs are cadmium plated carbon steel with a hardness of Rockwell "C" 40. Quality is very good.

Low-Alloy, Low-Carbon Steel

THE continuous wide strip mill is today showing more versatility than its best friends had ever prophesied. Not only are these mills producing large quantities of ship plate, but soon they may be contributing on a big scale to vital airplane production.

The experience of North American Aviation, Inc., with the use of flat rolled, SAE 4608, low carbon, low alloy steel has already released other metals for other uses. The photographs herein show various parts of airplanes made from the low-carbon, alloy steels which are also described herein.

The main impetus for using ordinary steel, cold-reduced to ob-

By W. F. SHERMAN

*Detroit Editor, THE IRON AGE
and*

T. C. CAMPBELL

Pittsburgh Editor, THE IRON AGE

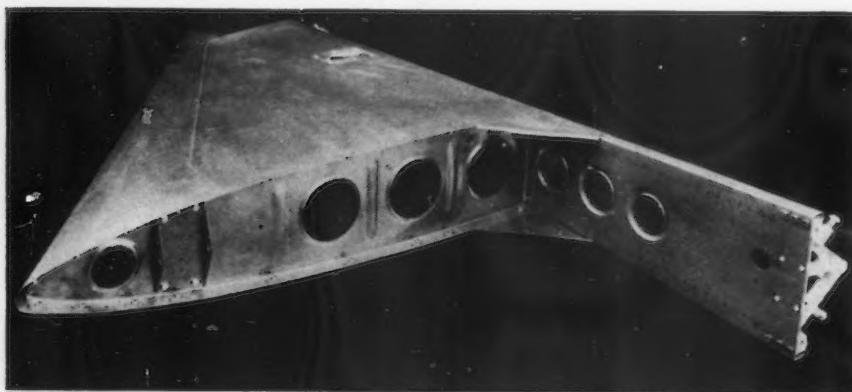
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with the development of this application of steel say that the production of three planes will take no longer than the time now required to build one. Greater use of spot welding for stressed parts and the reduction of inspection rejections, minimized because misplaced spots

can be taken care of by adding others, are said to be important contributing factors. Less experienced help is required to gun spot weld than to drill and rivet, and spot welded construction gives strong, stiff, and rigid structures.

Speed of production is also influenced by the availability of equipment and trained men for this type of construction from other industries such as home appliance, automotive, and furniture manufacturers. All of these industries are experienced in fabrication of steel and very little new training, except for production planning, would be needed. It is also believed that assemblies can start quickly, with slight rearrangement of existing tools and equipment and the construction of specialized spot welding machines.

Carnegie-Illinois Steel Corp. engineers, who have participated in the original plans and production of low-carbon, low-alloy steel for airplanes, not only are advocating and proving the application of low-



VERTICAL fin made from low-carbon, alloy steel (SAE 4608). North American Aviation, Inc., photo.

• • •

tain the required stiffness, is the urgent and immediate need for airplanes. Since the type of steel now being advocated for mass production of certain types of planes comes from large continuous mills that can throw out thousands of tons of this material in a short time, any raw material tightness in the aircraft industry can be relieved considerably. Of course, at the same time the chronic tightness in the steel industry would be slightly accentuated, although the tonnages involved would be comparatively moderate.

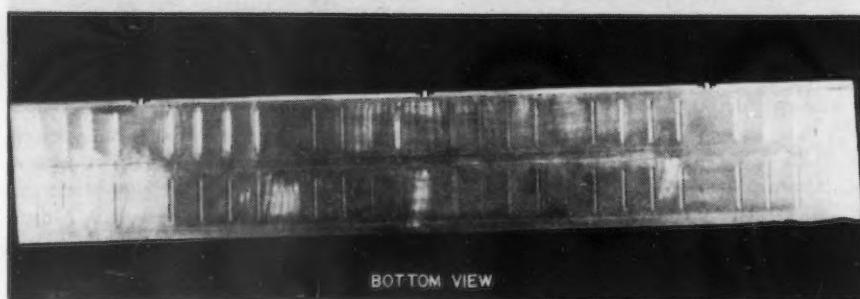
Certain enthusiasts connected

BELOW

FLAP made of SAE 4608 steel by North American Aviation, Inc.



DETAIL



BOTTOM VIEW

In Aircraft Construction

... North American Aviation, Inc., points the way by using low-carbon, low-alloy steel in the construction of trainer planes.

carbon, alloy free steel (U. S. S. Air-Ten 1010), but have gone farther by carrying out experiments on the perforation of this new type of steel, which will probably result in many new applications. The perforation reduces the weight of the metal, and, because of certain techniques in shape-forming, contributes to less total weight in the plane. Yet, it is claimed such perforated sheets have satisfactory stiffness. Carnegie engineers have called this property or factor "formed strength-weight ratio."

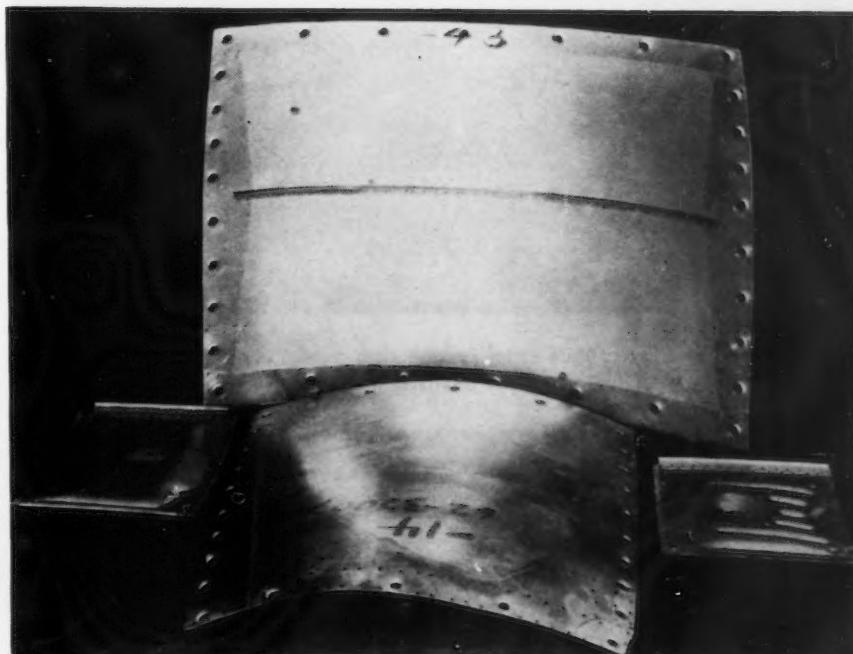
The problem of obtaining mass



Metal thickness (left) is 0.0317 in., area is 3.85 sq. in., and yield is 32,000 lb. per sq. in. Thickness of the metal on the right is 0.0315 in., area is 4.15 sq. in., and yield is 80,000 lb. per sq. in. This block test shows that beading the part increased the minimum yield from 32,000 to 80,000 lb. per sq. in.

stiffness is being solved by design methods, and the problem of holding down the weight is being solved by removing part of the material that isn't needed from the strength standpoint. The amount of weight reduction has not been reduced to any final figure as yet, but it is possible to remove some 60 per cent of the material by round-hole perforations. This practice meets and in some cases goes below the weight of other metal now being used in aircraft production.

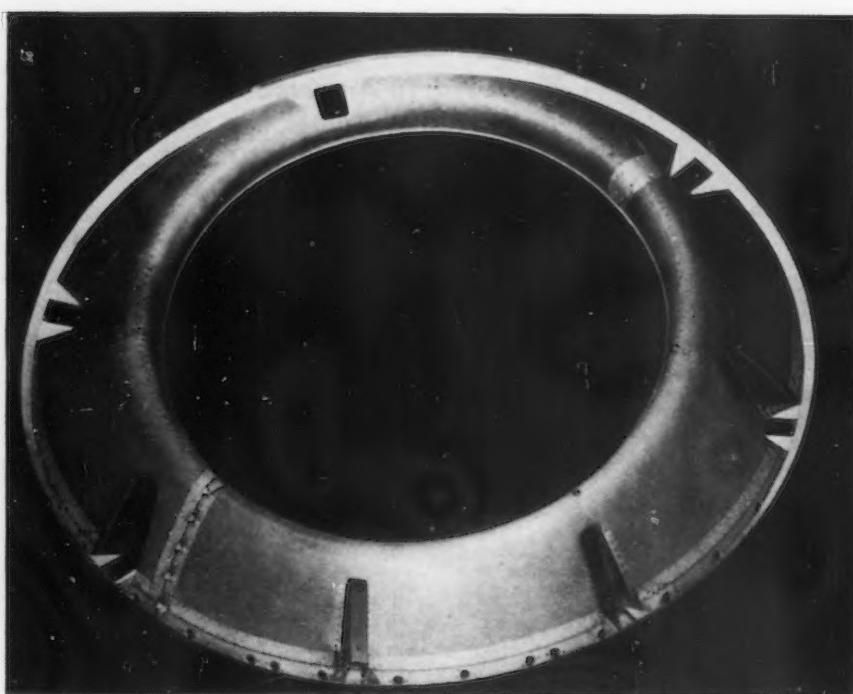
Briefly, formed strength-weight ratio is an aspect of the use of thin skinned materials, long columns, and other relatively unstable mechanical sections of structures,



LOW-CARBON, low-alloy steel engine cowling and cowl flaps. Photo by North American Aviation, Inc.



FRONT view of a steel engine ring cowl, of SAE 4608 steel, by North American Aviation, Inc.



REAR view of a SAE 4608 steel engine ring cowl. Photo by North American Aviation, Inc.

and it is an essential phase of any discussion dealing with the use of stress skin aircraft material.

To those familiar with the use and fabrication of such materials in this form, it is possible to increase the stiffness and strength, that is, practically to alter the weight-strength ratio by altering

the shape of the material. A simple example in which two test specimens, each only 2 in. long, were tested in compression (block rather than column test), gave the results on material with a yield of 100,000 lb. per sq. in. as shown in the accompanying drawings. This example corresponds closely with a stringer

for aircraft use, and such sections will show block failure rather than column buckling. It is claimed that because the yield on this type of steel is close to the ultimate strength value rather than spread apart as for some materials, it is possible to take advantage of this in designing.

On the general question of strength, preliminary data obtained by Carnegie-Illinois Steel Corp., seems to indicate that low-carbon steels similar to auto body types can be supplied in cold-reduced sheets with a minimum yield strength of 100,000 lb. per sq. in. and in various other types with yields of 50,000 to 70,000 to 80,000 lb. per sq. in. Depending upon the point of application in the aircraft, these yield strengths are said to be satisfactory for aircraft sheet metal work. The 100,000 lb. per sq. in. yield strength material is more difficult to form than the softer sheets, but sheets with various formability characteristics may be combined by spot welding, so there is no problem of making use of steel throughout this full range.

The low-carbon steel tested for aircraft applications by Carnegie-Illinois, similar to SAE 1010 steel, has a maximum of 0.12 per cent carbon and 0.60 per cent manganese, and the trade name Air-Ten indicates that this particular steel meets aircraft specifications that have already been tentatively drawn up. The major difference between Carnegie-Illinois' Air-Ten and the regular SAE 1010 is that the former is cold-reduced and processed to obtain desired physical characteristics. In Table I, various strength specifications are indicated in terms of minimum yield strength. The low tensile materials will be those with 25,000 lb. per sq. in. minimum yield values and are marked C (for carbon) 25; and higher strength material ranges up to C 100, with 100,000 lb. per sq in. yield.

When yield strengths ranging up to 100,000 lb. per sq. in. are available, it is said there is no particular worry about the "formed strength-weight" ratio as such.

Developments have already demonstrated that a second sheet—expanded material—might be corrugated or otherwise stiffened by shaping. Then all the points in contact with the initial flat sheet are spot welded to it. A still further step on which experiments are going forward makes use of

TABLE I
U. S. S. Air-Ten Minimum Physical Properties

Type	Minimum Yield, 0.2 Per Cent Offset	Ultimate Strength, Lb. Per Sq. In.	Elongation in 2 in., Per Cent
C 25	25,000	40,000	20 to 35*
C 42	42,000	46,000	15 to 25*
C 50	50,000	54,000	8 to 12*
C 70	70,000	72,000	3
C 80	80,000	85,000**	6 to 9**
C100	100,000	Tests incomplete	2 to 4**

* Increasing with thickness.

** Expected (tests not quite completed).

Note: Tolerances and flatness of these materials are sufficient to meet aircraft requirements in gages from 0.008 to 0.060 in.; widths, 30 and 36 in.; and lengths, 60 to 120 in.

TABLE II
U. S. S. Carilloy Alloy (SAE 4608) Minimum Physical Properties

Type	Minimum Yield, 0.2 Per Cent Offset	Ultimate Strength, Lb. Per Sq. In.	Elongation in 2 in., Per Cent
A	30,000	50,000	20 to 35
B	100,000	*	6 to 9
C	70,000 to 75,000	*	*

* Statistics not yet final.

Note: Tolerances and flatness of these materials are sufficient to meet aircraft requirements in gages from 0.010 to 0.060 in.; width, 30 in.; and length, 120 in.

another flat sheet, expanded, perforated, or in normal condition, which is spot welded to the corrugated or shaped piece to form a sandwich construction. This type of construction is extremely stiff and has a good strength-weight ratio. Herein, it is claimed, lies the key to possible increased use of steel sheets in aircraft construction. Practical combinations of whole sheets and perforated sheets or expanded metal already have been developed and used to produce panels as stiff, strong, and as light as other materials, with adequate strength claimed for the particular applications.

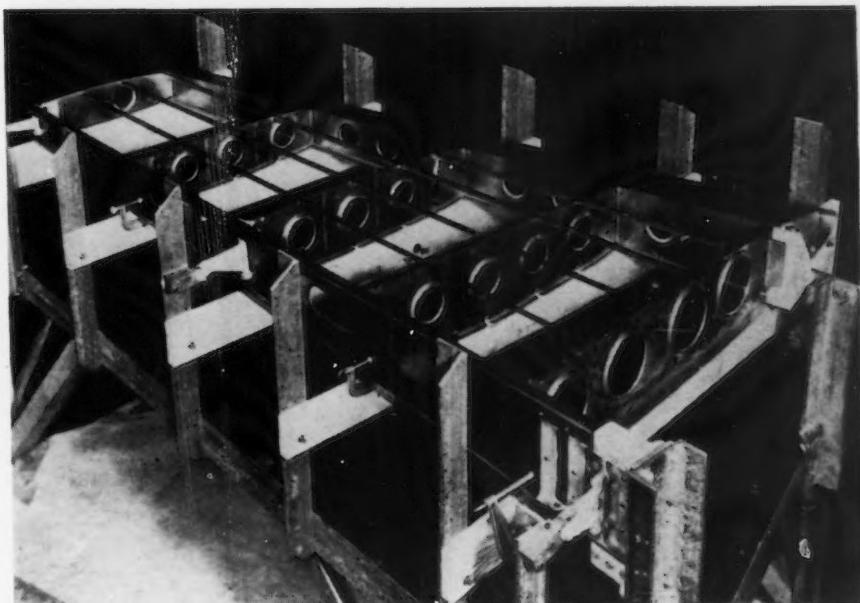
Experimentation now under way leads to the belief that sandwich construction is likely to be adopted for various aircraft parts including door panels, bomb bay doors, and flooring. Some medium bombers require about $\frac{1}{2}$ ton of flooring material and this is expected to be one of the first large-scale practical applications of this type of construction using perforated materials. North American's present construction of trainers, involving the use of low-carbon, alloy material, is the first important step away from higher cost as well as relatively scarcer materials.

Other prospective applications of alloy-free, low-carbon steel that has been cold-reduced to obtain strength characteristics and which may be used either as single, formed, perforated or expanded sheets or combinations of these, include such items as gasoline tanks, face plates, cores, accessories, bucket seats, troop transport seats, corrugated flooring, stringers, ribs, ammunition boxes and chutes, navigation tables, compartment walls, and other mobile equipment.

Since stove, refrigerator, container, and building material manufacturers, as well as others in similar lines, are in a position to offer their experience in this new field of manufacture, many of them will take the initiative in acting as sub-contractors for the production of these parts in the quantities desired.

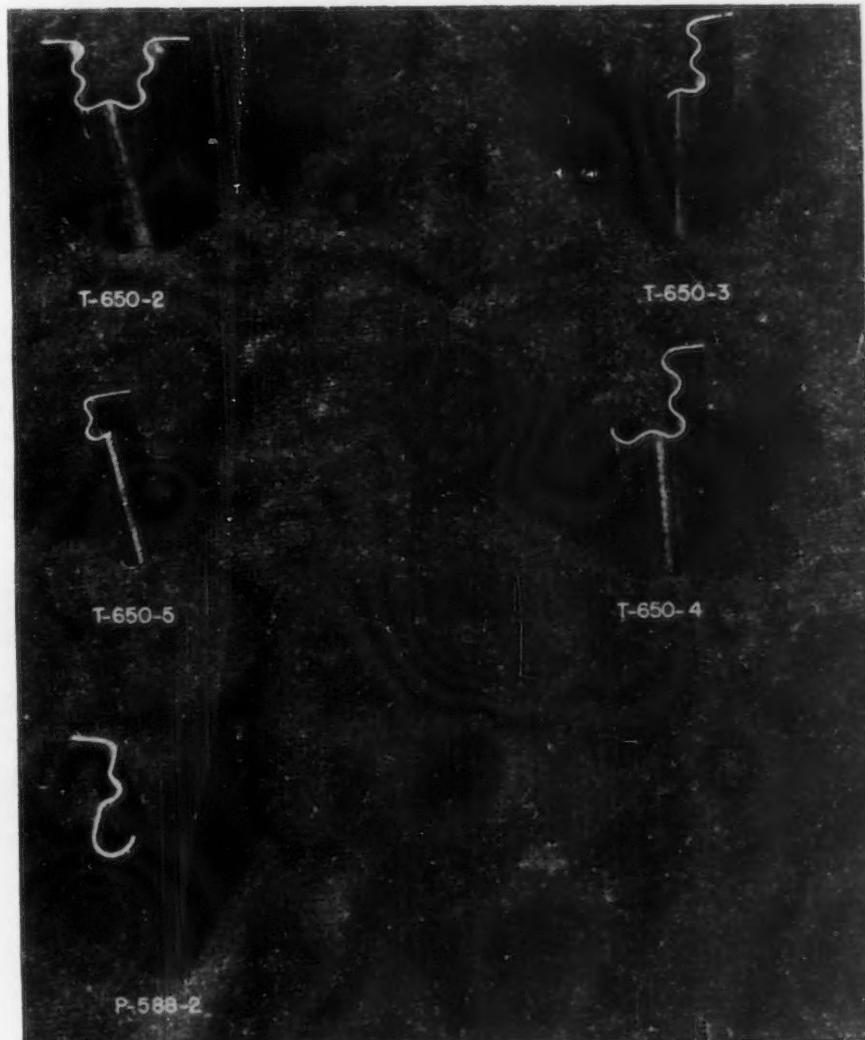
Spot Welding

On a recent evaluation of spot welds compared with rivets, a spot welded steel control surface was tested to 120 per cent of design load and failed by buckling of the material. No weld failed. Then the part was straightened by hammering, just as an auto fender would be, and was tested in a vibration testing machine for 25,000,000

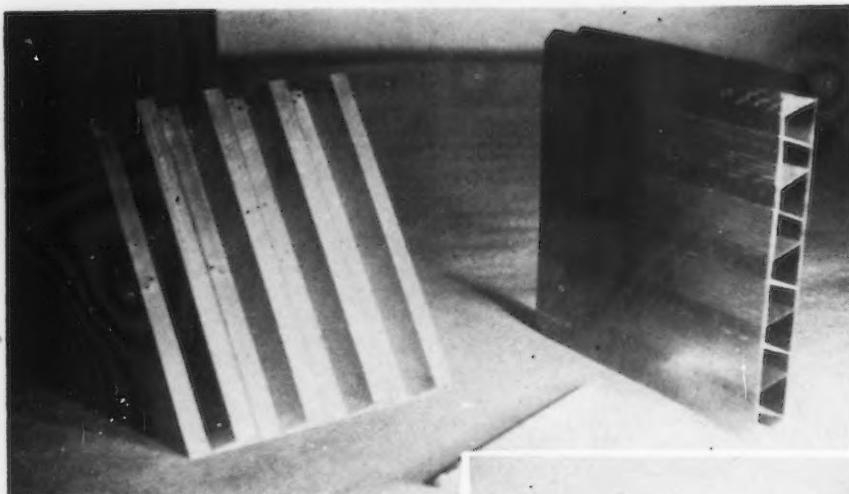


Horizontal stabilizer (SAE 4608 steel) made by North American.

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TYPICAL steel (SAE 4608) stringers for a wing outer panel. Photo courtesy North American Aviation, Inc.



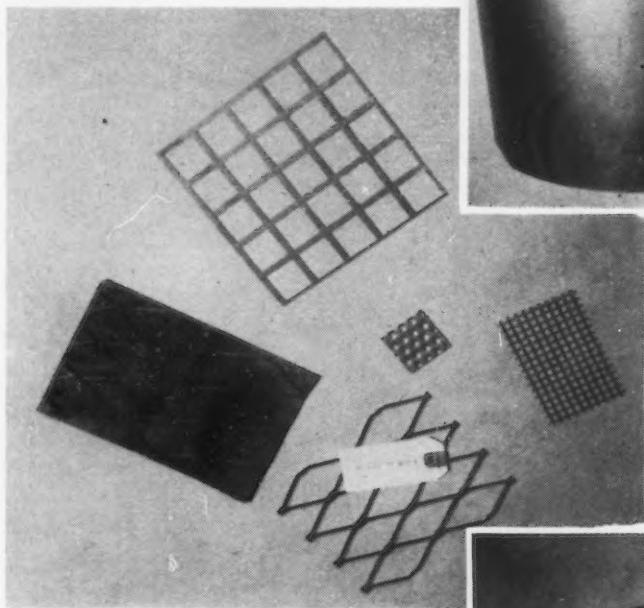
LEFT

SANDWICH construction of the combination of perforated and solid sheets. The panel at left is a formed section of perforated material and the panel at right is a combination panel, with perforated sheets in front and the solid sheet, or skin surface, in back.

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BELOW

SAMPLES of steel reinforcing panels and, at left, a reinforcing panel welded to a solid sheet.

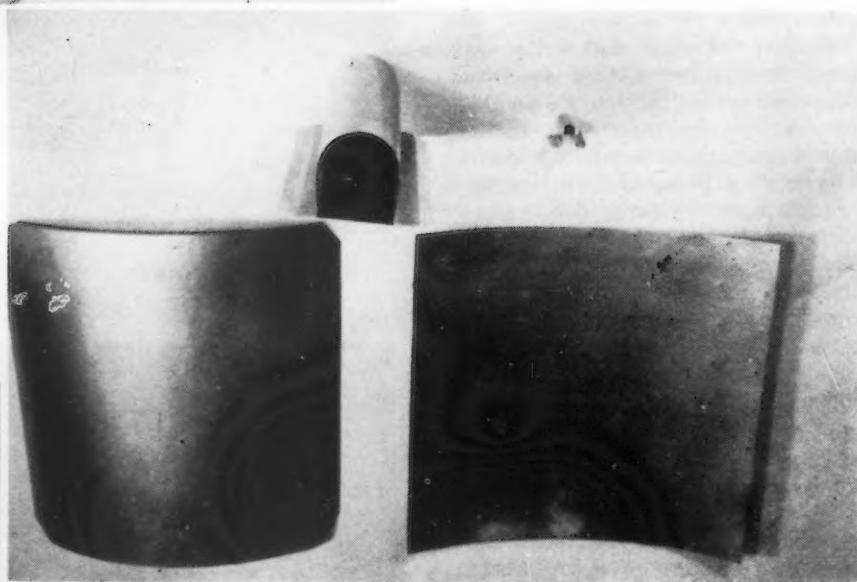


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RIGHT

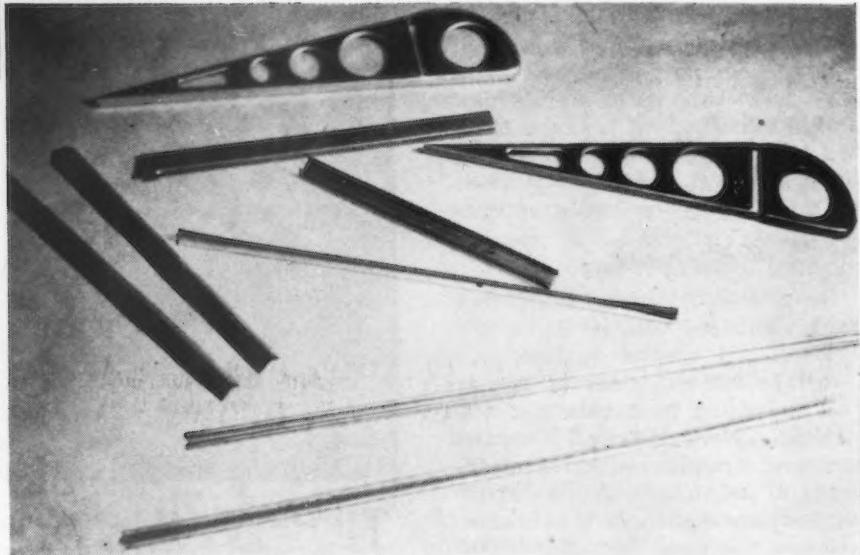
AILERON ribs and other sample aircraft sections made of steel.

• • •



ABOVE

VARIOUS sections of steel employed in aircraft construction. At left (concave) is a steel sheet and at right is the reverse (convex) side showing reinforcing sheet of perforated metal, welded to the solid sheet. Above are two sections of perforated metal that can be used for stringers or other structural parts.



cycles without failure of either weld or material. Test coupons, cut from the specimen, were pull tested, the results showing the physicals to be the same as in the original state. This demonstrates the ease of repair to damaged aircraft or parts. If the material is not cracked, maintenance is simple. If spots are broken, repairs may be made by metal screws, by spot welding, or by soldering.

In the use of steel for aircraft production, chemical treatment either before or after forming is suggested for rust prevention. The Army has already approved a treated surface that is covered with a prime coat and finish coats

to prevent the spread of corrosion from a scratch. The chemical treatment must be controlled so that it will not interfere with spot welding, but extensive tests by aircraft companies are reported underway and provide the solution to this problem. Since the use of paint on steel is already specified as necessary to provide camouflage or squadron recognition, it is not considered to add to the weight of the plane.

It seems that the various potential applications of ordinary low-carbon, cold-reduced sheets will be exploited more fully in aircraft production before the same is true

of perforated material, but there is every indication that the latter development may reach a much wider practical stage more quickly. Some sources recommend the use of perforated material, both for structural and non-structural parts, alone or in combination with solid sheets.

Wide scale use of this material awaits only further trial applications and capitulation of data, but the urgent necessity for planes and more planes may decide the entire issue of ordinary steel for airplane production to a far greater extent than could be dreamed by wide continuous strip mill operators.

Testing for Under-Surface Flaws

BEARING races and other similar cylindrical heat treated parts are being quickly and accurately inspected for under-surface flaws by an electromagnetic test method. The test for flaws, developed by P. H. Brace and C. S. Williams of the Westinghouse Research Laboratories, requires no contact with the inspected part and performs the inspection without marring or denting polished surfaces.

When a symmetrical piece of steel is properly heat treated and then magnetized, the external magnetic field is uniform. However, any defects in the heat treatment, such as hard or soft spots, change the permeability of the faulty region and the magnetic pattern. In actual testing, the heat treated part is first demagnetized completely to wipe out all traces of residual magnetization. The piece is next rotated at high speed and at the same time strongly magnetized, so that flux extends outward from the surface being tested. Finally this flux is explored with an electromagnet consisting of an alloy bar surrounded by a coil. Only variations of the magnetic field induce a voltage in the coil, which is amplified and indicated by means of oscilloscope. The test piece is rotated synchronously with the cathode-ray sweep, as shown in the illustration,

so that the field is traced on the tube screen. When the field is uniform, the screen shows luminous straight line, but faults show up in the oscilloscope trace as dips. A second trace on the tube screen acts as a reference line and carries 12 index points, corresponding to 30 deg. angles around the test piece. By this means a fault can be

spotted on the periphery within a few degrees.

Although the oscilloscope affords only a visual indication of the fault, it is possible to add a relay system to give an audible signal by means of a bell or buzzer, or even to operate automatic machinery for segregating defective pieces coming from a production line.

Silver Additions To Copper

IMPROVING copper by small silver additions has been recently gaining serious consideration. Silver is especially useful in copper which is to be soldered, as the heat applied does not result in undue softening of such an alloy. In commutator bars, for example, a small percentage of silver insures that hardness will be maintained. Fractional percentages of silver in photo engravers' plates prevent the softening of cold-rolled copper sheet while it is processed at elevated temperatures. Some commercial copper alloys designed for high conductivity contain about 1 per cent of silver and over 95 per cent of copper, though hardening elements such as beryllium, cobalt, cadmium or tin may be added.

Silver is often an important element of brazing alloys in which copper, even up to 85 per cent, is one ingredient, but in these alloys 10 per cent or more of silver is commonly used. High fluidity and good penetration into small clearances, as well as low melting points are among the advantages gained by the use of silver in such alloys.

There are, however, many silver alloys, including coin silver, sterling silver and alloys containing refractory metals or carbon which are employed effectively in electrical contacts and which possess other properties such as greater hardness and superior abrasion resistance, for example, as compared with fine silver.

Electroplaters Discuss Armament Applications

A NUMBER of the better known surface treatments for magnesium were outlined in a paper given by H. K. DeLong and W. H. Gross, Dow Chemical Co., Midland, Mich. Cleaning of magnesium and its alloys may be divided into three types: Solvent, alkali and acid pickling, the authors pointed out.

Solvents in the vapor or liquid phase are of the same type as for other metals: Chlorinated solvents, naptha, etc. An emulsion cleaner can be used, consisting of kerosene and an oil-soluble soap. The dip is used at from room temperature to 140 to 160 deg. F., and the dipping time is 3 to 5 min.

Alkaline cleaning is necessary to remove the residue from the solvent cleaning and also the chrome-pickle coat normally present on magnesium parts when they leave the fabricator and before they go to the finishing department. Alkaline cleaners should be strong, with pH above 11. A satisfactory soak cleaner consists of:

Trisodium phosphate	4 oz.
Sodium carbonate	4 oz.
Soap (or wetting agent)	0.1 oz.
Water	1 gal

It should be operated at boiling, preferably; if used at 180 deg. F., it must be agitated. Immersion time is 5 to 15 min. The same bath can be used for electrolytic cleaning at 160 to 180 deg. F. without agitation, and the soap omitted. The work is the cathode. Current density is 10 to 20 amp. per sq. ft. and time is 1 to 3 min. Rinsing must be thorough.

Acid pickling will remove oxides and graphite-base lubricants. A recommended pickle consists of 1.5 lb. of chromic acid, with water

. . . Last week's report on the Grand Rapids convention of the American Electroplaters' Society is concluded here with abstracts of papers on surface treatments for magnesium, the sulfamate lead plating process, the effects of surface finish on the protective value of electroplated coatings on steel and military applications of electroplating.

added to make 1 gal. The chloride and sulphate content of the water should be low.

If sand blasting is employed, it must be followed by a pickle of:

Nitric acid (conc.)	8 parts
Sulphuric acid	2 parts
Water	90 parts
Time of pickle, 10 to 15 sec. Room temperature.	

This pickle must be applied before machining as the amount of metal removed exceeds dimensional tolerances.

The finishes are of two types—decorative and protective. The authors described both, but the important finishes today are the protective, used for preparing the metal for a suitable paint or other protective film.

Electroplating of magnesium alloys is now possible. It involves the customary buffing and cleaning; then a dip in a chromic-nitric acid bath; then in a hydrofluoric-nitric acid bath; then plating in a nickel borofluoride bath. The nickel plate can be covered with chromium.

The protective finishes include the chrome pickle, chrome sulphate, dichromate, galvanic anodize, modified alkaline dichromate, sealed chrome pickle, and anodic treatment.

A chrome pickle for protection of raw parts is accomplished by a 15 to 120 sec. immersion at room

temperature in an aqueous solution of 1.5 lb. of sodium or potassium dichromate, and 1.5 pt. of concentrated nitric acid per gal. This pickle also provides a deep etch which helps to anchor the subsequent paint applied.

Chrome sulphate gives a coat of low dielectric strength for the same purpose as above. This treatment calls for 30 to 60 min. at room temperature in a bath of 6 per cent magnesium sulphate and 4 per cent potassium dichromate. At 150 to 160 deg. F. the time is reduced to 10 to 20 min.

The Dichromate finish is most widely used today. It gives maximum protection, good adhesion and little or no dimensional change. The first bath is 15 to 20 per cent by weight of hydrofluoric acid; and the time of the dip is 5 min. The second bath at the boiling point, is 1 lb. of sodium, potassium or ammonium dichromate per gal. of water. The time of dip is 45 min.; pH is 4.2 to 5.5.

A galvanic anodize finish may be secured by the hydrofluoric acid dip, described above, followed by immersion in a solution containing: 4 oz. each of ammonium sulphate and sodium dichromate, plus 1/3 oz. of ammonia (sp. gr. 0.880).

The parts are the anode, the tank, the cathode. Maximum current density is 10 amp. per sq. ft.,

and a uniform coating requires 70 amp.-min. or more.

The modified alkaline dichromate finish uses the same solutions as the galvanic anodize but a different operating technique. After the hydrofluoric acid dip, the work is boiled 45 min. in the sulphate dichromate-ammonia solution instead of being anodized. A final treatment is a seal, boiling 5 min. or more in an aqueous solution of 1 per cent arsenous oxide.

A sealed chrome pickle is obtained through use of the regular chrome pickle described above, followed by boiling for 30 min. in 1 lb. of sodium dichromate per gal. of water.

The operating details of the anodic treatment are given in Navy Aeronautical Specification PT-13d. It calls for a hydrofluoric acid pre-dip, after which the parts are made the anode in an aqueous electrolyte containing sodium phosphate and sodium dichromate. For work of complicated shape, recesses, etc., special conforming anodes must be used.

Sulfamate Lead Plating

E. W. Schweikher, E. I. du Pont de Nemours Co., Cleveland, presented an interesting outline of a comparatively new plating technique, employing sulphamic acid. A comparatively young commercial material, it is rapidly finding wider uses in industry. The basis of this new lead plating process is the lead sulfamate solution with addition agents, which together produce a ductile pore-free deposit.

The solution is made up with prepared plating salts and two special addition agents. The bath composition is as follows:

	oz. per gal.
Lead salts	40
Addition Agent No. 1	1.3
Addition Agent No. 2	0.04

The bath should be operated at a temperature of 140 deg. F., with a pH of 1.5. Addition Agent No. 1 is a stable organic compound whose purpose is to provide a dense, smooth deposit free from trees. It is most important for plating flat surfaces. Addition Agent No. 2 is important for plating irregular shapes or barrel plating.

The anode-cathode ratio is approximately 1 to 1. Some lead sulfate settles out of the solution, but seems to do no harm to the smoothness of the deposit, in thicknesses

even as great as 0.003 in. Anode and cathode efficiencies are 100 per cent. Changes in pH may be adjusted by adding sulphamic or sulphuric acid if it rises too high, or sodium hydrate if it goes down. Anodes of lead are good, but need not necessarily be of chemically pure quality. Cathode current density may be up to 40 amp. per sq. ft. for flat work; for higher current densities or irregular shaped work, cathode rod or air agitation should be used. At 20 amp. per sq. ft. the deposit will be 0.001 in. in 20 min.

The throwing power of the solution is zero but the covering power is good, providing Addition Agent No. 2 is used.

Adhesion directly to steel is not of the best but with good cleaning and a severe acid etch it will be fair. Adhesion over a copper flash is good.

The solution may be contained in wooden tanks and operated at 6 volts, still; 12 volts for barrels.

This plate is recommended for corrosion resistance, instead of the more critical metals, cadmium, copper, nickel, etc.; also as a lubricant for wire drawing.

Indium Plating

A paper on indium plating traced the history of indium from its discovery and listed its physical and chemical properties, sources and uses. William S. Murray, Indium Corp. of America, Utica, N. Y., was the author of this work. A description was also given of indium plating in which some of the most promising applications lie, both for decorative and functional designs. Indium alloy coatings are easily polished and burnished, which makes it often unnecessary to pre-polish the harder basis metal. The color is low on the blue side of the spectrum, not far from silver in appearance.

For plating, the work should be degreased, alkaline cleaned, rinsed, etc., and then plated (if the basis metal is steel) with a coating of some non-ferrous metal which will alloy readily with the indium, such as lead, copper, cadmium, zinc or silver. The thickness of the under-coating may be regulated to suit the requirements of the work. For example, a bearing surface may be several thousandths thick whereas for decorative purposes, flash deposits will be sufficient. If the basis metal is non-ferrous, indium may be plated direct.

After the indium is plated on the undercoat, diffusion may be effected by heat treatment at the proper temperature, depending upon the undercoat used.

Indium coatings are recommended for reflectors, for corrosion resistance and for a variety of special uses. Details of the indium plating procedure were published in THE IRON AGE for Dec. 19, 1940.

The savings effected by the substitution of iron for nickel and copper in printing plates were described by V. A. Lamb and William Blum, National Bureau of Standards, Washington, who told the group that iron is regularly plated on the lead-antimony-tin alloy stereotype plates of conventional methods, using the ferrous ammonium sulfate solution. In work of this character it is important that the deposit on iron be hard, but not brittle. It is also difficult to keep the deposit of iron flat on graphited wax molds, as the tendency of the plate is to curl. The bath in most general use today for electrotypes consists of 32 oz. of ferrous chloride and 24 oz. of potassium chloride. It should be run at room temperature, plus 5 to 10 deg. F. The pH should be 5.5 (glass electrode). Lower pH results in harder deposits.

It is common practice to use what is known as the "oxidizing" deposit on graphite, similar to electrotypes. Iron filings are dusted onto the graphite and covered with dilute copper sulphate, resulting in a deposit of about 0.00001 in. of copper, upon which a subsequent electrodeposit of copper is applied. Anodes for iron plating are of pure iron, such as Armco; low carbon steel may be used but sludges rather badly. The paper gave full details concerning cleaning methods.

As used at the present time, the deposit consists of about 0.0004 in. iron over 0.002 in. copper. A deposit composed solely of iron is not ductile enough to stand stripping from the plates; hence the use of copper, which of course, can be stripped and salvaged after use. It is also the practice to iron plate, then dip in a mixture of hydrochloric acid and arsenic as recommended by Watts, for improving the adhesion of copper plate on iron; and then copper plating.

These methods have made it possible to save all of the nickel and perhaps two-thirds of the copper

which formerly went into printing plates.

Electroplated Coatings on Steel

Under the AES Research Project now being carried on at the Bureau of Standards, the effects of surface finish on the protective value of electroplated coatings will be investigated, using as basis metal, hot and cold rolled steel, rolled and cast brass and zinc base die casting. To date, the work is still confined to steel. G. A. Lux, who is working on the project, aroused considerable discussion by this paper and some of the remarkable tentative conclusions which he presented.

A large number of specimens of polished and plated sheets have been exposed to the atmosphere in various localities for 2 to 9 months. Methods of polishing the steel, the compositions used, etc., were described in last year's report. Since then additional samples have been prepared with a 220 grease finish and also with some proprietary greaseless aluminum oxide compounds. All specimens were degreased, alkaline cleaned and polished. The cleaners were anodic, cathodic and some in combination. The plates consisted of Rochelle salt copper, dull nickel and bright nickel, all with a deposit of 0.00001 in. chromium. Some of the dull nickel was buffed and the buffed samples checked for loss of metal. The samples were exposed at Sandy Hook, N. J., Washington, and New York. The inspection and ratings were done by the seven members of the research committee and the ratings were based solely upon the amount of rust present.

Tentative results to date (not complete as yet, but simply indications) were as follows:

1. The surface finish of the basis metal has no effect upon the protective value of the plate.
2. Various depths of polish or the amount of metal removed has no effect.
3. The steel used (from two separate shipments) had no effect.
4. The method of cleaning, anodic or cathodic, made no difference.
5. Thickness of plate: protection increased with thickness of deposit.
6. The unbuffed nickel plated samples were more protective than the buffed. This was especially evident on cold rolled steel.
7. Bright nickel was tested with and without a copper undercoat and the improvement produced by the copper undercoat was evident.

At the present time a check is being made of the dull and bright nickel deposits with and without copper undercoats.

Practically all published data on this subject has been based on the salt spray test. This test was checked against similar tests—ferroxyl, hot water, moisture condensation, etc. Variations to date were found due to porosity. The conclusions are that the salt spray results are not as reproducible as outdoor exposure tests. It was found that the salt spray attacked the nickel coatings as well as the base metal, slightly in the case of the dull coatings, and a little more in the bright coatings. It is probable that the salt spray attacks the inclusions in the nickel deposit. No correlation is evident between the salt spray test and outdoor exposure.

The ferroxyl test showed wide variations and no correlation with outdoor exposure.

The hot distilled water test, using tinned steel containers, showed poor reproducibility and no correlation with outdoor exposure.

The moisture condensation test was less sensitive than the others, showing no rust in 50 days on dull nickel and only a little rust on bright nickel direct.

The tentative conclusion to date is that accelerated corrosion tests have poor correlation with each other and with outdoor exposure tests, and are consequently of low significance.

This report aroused considerable discussion. Mr. Pinner pointed out that its conclusions were at variance with his own work which had been based on the salt spray test and that Mr. Lux's work might result in the final condemnation of the salt spray test. He pointed out that in polishing, Mr. Lux had removed about 0.001 to 0.003 in. from the steel; perhaps not enough to duplicate commercial conditions, as his own work, removing 0.003 to 0.008 in. from hot rolled steel, had resulted in great improvement against the salt spray test, of the plated stock. He agreed that with perfect cold rolled steel, preliminary polishing had no effect, little metal being removed; but with commercial cold rolled steel more metal was removed and more improvement was noted.

Mr. Heussner stated that the difference in carbon content of the

cold rolled steel (0.010 C) and the hot rolled steel (0.85 C) might have had some effect.

The discussion following included questions of the angle at which the specimens should be hung in the salt spray cabinet, a variety of different constructions of the cabinet, the pressure of air, the volume of brine, etc.

A brief summary of the available supplies of critical metals was given by H. A. Anderson, chief of the Conservation and Substitution Branch of the WPB bureau of industrial conservation.

It is the duty of the conservation and substitution branch to conserve all scarce material and to substitute those materials which are less scarce. All WPB orders are concerned with the need for materials, manpower or facilities. The Conservation and Substitution Branch has issued from time to time a list of critical materials, showing the status of our available supplies. Concerning the individual metals: The following, he said, is the situation at the present writing:

Magnesium—Will have increased in production 60-fold and will still be tight.

Aluminum—Production capacity now 2,600,000,000 lbs. per year, and still very tight. We need every pound for airplanes.

Nickel—Increasing in output steadily to 180 million pounds this year, but still so short that nickel in armor plate is being reduced.

Tin—Now that imports from Malaya and Dutch East Indies, formerly smelted in England, have been stopped, we have only one smelter, in Texas, with a capacity of 1500 tons per month available. Our stock pile is inadequate and is not replaceable. We have four detinning plants for scrap and six more being built, but the reduction in the thickness of tin on tin plate from 1.65 lb. per base box to 1.25 lb., 1 lb. and 0.5 lb. for electrolytic, and the elimination of tin plate entirely for many purposes means that less material will be available for these detinning plants; and in some quarters their advisability is questioned.

Copper—Situation getting worse, although the supply is growing slowly, from American producers under a bonus for the high cost operators. South American imports are slowing down due to lack

of bottoms. At the same time requirements are constantly increasing.

Zinc — High grade getting tighter.

Lead—Not in bad shape.

Steel—Getting steadily worse. The present output of 83 million tons per year is not enough.

Silver—Getting steadily tighter. Efforts are being made to obtain government stocks for industry. A loan of 40,000 tons for bus bars in aluminum and magnesium plants was effected, but the big stumbling block is the Silver Act which forces us to pay 71c. per oz. for about 2500 tons per year of domestic silver against 34-5c. per oz. for 3500 tons of foreign silver. The Treasury cannot sell domestic silver until our total stocks come up to a certain ratio of the gold stocks. The author characterized the operations of the Silver Bloc as "damnable!" Silver should be available for non-deteriorating uses and returnable. If so, 8000 tons of the metal would be available for industry, exclusive of bus bars. The Silver Act should be repealed.

Platinum and gold—Used in very thin coatings on silver, they have been said to diffuse and lose their corrosion resistance. The author pointed out, however, that this was not the case. Such coatings have been shown to be corrosion resistant under the very severe egg-shell test, and can be used effectively for surgical instruments.

A new process for plating chromium effectively on silver has been developed by the Underwood-Elliott-Fisher Co., Hartford, Conn. (according to George B. Hogaboom, consultant on metal finishes to the conservation and substitution branch). This concern, it was stated by Mr. Hogaboom, will license its process at a nominal figure, for the duration.

Efforts are being made to electrodeposit tin on steel, using existing facilities, idle nickel plating and other tanks, before and perhaps during the operation of the new strip tin plating lines which are going in. At this moment, the bottleneck in sheet production is black plate.

Hard Chromium Plating

The value of hard chromium plating in the manufacture of war materiel was set forth by A. W. Logozzo, Hartford Chrome Corp., Hartford, Conn. He pointed out that it can be used to increase wear

resistance, as well as for salvaging worn and mis-machined parts by building-up. In the treatment of the part prior to plating it is important to remove excessive strains by proper heat treatment before depositing the chromium. The work is first degreased, then cleaned in an alkaline bath, then pickled, with appropriate rinses, etc. Lapping gives a better surface than grinding, giving a smoother plate and eliminating the nodules in the deposit, which would be knocked off during the later grinding. Grit blasting and etching are also used to prepare the surface. A first-rate preparation schedule consists of grinding, lapping, buffing, and etching (10 min. in a chromic acid solution). The etch should be anodic to prevent hydrogen embrittlement. Hydrogen embrittlement, although troublesome, can be removed by heat treatment after plating, under careful control. All cleaning should be anodic to prevent the absorption of hydrogen at the work surface. All cleaning should be done in a separate tank, not left to the chromium plating tank.

Gentle agitation is useful in the chromium plating solution to keep hydrogen from collecting at the cathode.

The preparation of work for hard chromium plating may be summarized as follows:

1. A case history of the work should be obtained before starting the plating operation.
2. The proper heat treatment should be used to remove strains in the work. Said treatment depends upon the type of work and its function.

3. No cleaning should be attempted in the plating bath as this practice embrittles the work; a separate cleaning tank should be used.

4. Heat treatment after plating to eliminate hydrogen may consist of a short run at 300 to 500 deg. F.

5. The grain size of the chromium deposit is determined by the condition of the surface of the work before plating.

Anodized Aluminum

A number of theories have been suggested to account for the adhesion obtained by the Travers method of plating aluminum. W. J. Travers, Krome-Alume, Inc., Buffalo, presented some evidence

which suggests the presence in the anodized aluminum film, of a reservoir of oxygen that reacts vigorously with the initially deposited metallic film. In other words, on the original anodic oxide film, a second oxide film is applied which acts as a binder, holding the main deposit of the metallic coating to the aluminum oxide undercoat. The second or intermediate film does not assume its normal metallic aspect until the oxygen in the anodic film has become depleted.

Military Applications Of Electroplating

The chief of the electrodeposition division, National Bureau of Standards, Dr. William Blum, discussed in detail the uses of electroplating and metal finishes for the following war products:

ORDNANCE

Guns—

Chromium plating interior of large caliber gun barrels

Chromium plating interior of small arms

Chromium plating exterior of small guns

Chromium plating rollers and circles for gun mounts

Copper plating on undersized gun parts

¹ A list of these products was originally compiled by Dr. Blum and W. W. McCord of the WPB under the title, "Typical Present and Suggested Military Applications of Electroplated Coatings."

Ammunition—

Plating copper or zinc on steel cartridge cases

Deposition of copper driving bands

Cadmium or zinc plating of fuse parts

Lead plating inside of underweight shells (used in 1918)

Sheet steel plated with copper, zinc or lead for lining ammunition shipping containers

Tanks—

Brass plating of steel track for rubber adhesion

AERONAUTICS

Engines—

Chromium plating of engine parts

Chromium or nickel plating of steel propeller blades

Lead, silver and indium plating on bearings

Nickel plating for fit of engine parts

Copper plating before carburizing

Tin plating before nitriding

Lead plating on bronze bushings for "run-in"

Nickel plated steel to replace nickel alloys for manifolds, etc.

Nickel, iron or chromium plating on worn or undersized parts

Fittings—

Cadmium or zinc plating on brass and steel parts, especially in contact with aluminum

(CONTINUED ON PAGE 135)



During the Crimean War (1854-56) a Vermont village hummed with the well-ordered haste of war-time production as Robbins & Lawrence sped the filling of their contract for 25,000 Enfield rifles for England. New buildings were erected and new machinery designed, built and installed, but still work was limited by the hours of daylight. To beat uncooperative nature a plan was adopted to accomplish a daily average of ten productive hours throughout the year by adapting the hours of work to the hours of daylight and a schedule, or "Bell Card" was hung in every worker's home. During the long days of summer the bell rang at 4:30 A. M. and again at 6, when work began. As the days grew shorter so did the hours until, on the shortest day of all (the day before Christmas) work began at the luxurious hour of 7:29. Thus by originality as well as by hard work Robbins & Lawrence (Jones & Lamson's direct predecessor) supplied the desperate need for arms.

The Bell

ROBBINS AND LAWRENCE COMPANY BELL CARD. AVERAGE—TEN HOURS FOR THE YEAR

MARCH.	APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1 5.22	2 6.21	3 6.21	4 6.21	5 6.21	6 6.21	7 6.21	8 6.21	9 6.21	10 6.21	11 6.21	12 6.21	13 6.21	14 6.21	15 6.21	16 6.21	17 6.21	18 6.21	19 6.21
2 6.21	3 6.21	4 6.21	5 6.21	6 6.21	7 6.21	8 6.21	9 6.21	10 6.21	11 6.21	12 6.21	13 6.21	14 6.21	15 6.21	16 6.21	17 6.21	18 6.21	19 6.21	20 6.21
3 6.21	4 6.21	5 6.21	6 6.21	7 6.21	8 6.21	9 6.21	10 6.21	11 6.21	12 6.21	13 6.21	14 6.21	15 6.21	16 6.21	17 6.21	18 6.21	19 6.21	20 6.21	21 6.21
4 6.21	5 6.21	6 6.21	7 6.21	8 6.21	9 6.21	10 6.21	11 6.21	12 6.21	13 6.21	14 6.21	15 6.21	16 6.21	17 6.21	18 6.21	19 6.21	20 6.21	21 6.21	22 6.21
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Rang at 4:30 a.m.

INDUSTRIAL production has travelled far since the days of the "Bell Card" but again the time comes for heroic effort as America, "Arsenal of Democracy," supplies not only its own war needs, but those of half the world in this time of struggle.

No need now for "daylight saving" plans as brilliant, modern lighting speeds production for full twenty-four hours. But there is still need, and there always

will be need, for pioneering ideas in industry.

For ideas as new and as sound as those that vitalized this neighborhood years ago Industry can look to Jones & Lamson . . . ideas that will help you in today's emergency and in the hard times that lie ahead.

Inquiries from large or small companies all receive the careful, detailed study of our engineers.

JONES & LAMSON MACHINE COMPANY

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

Springfield, Vermont

U. S. A.



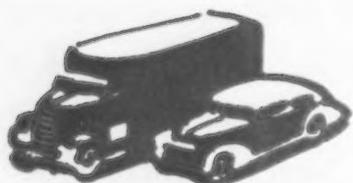
PROFIT PRODUCING
MACHINE TOOLS

SADDLE TYPE
UNIVERSAL TURRET LATHE

RAM TYPE
UNIVERSAL TURRET LATHE

Assembly Line . . .

• **Continental awarded new facilities contract for erection of plant for volume production of aircraft engines . . . Van Norman official predicts new auto motors in post-war era.**



DETROIT — The announcement that The Continental Aviation & Engineering Corp. has been awarded a new facilities contract for the erection of a plant for the volume production of aircraft engines appears to be a further development of a project on which Continental has been working for several months.

The new plant probably will operate in conjunction with the Continental plants now located at Muskegon, although the exact location of the new plant has not been disclosed. The structure itself will be noteworthy by reason of the use of wood and other substitutes for critical materials throughout. Exterior walls and piers will be of brick; interior columns, trusses and sash will be of wood. Mass concrete footings without reinforcement will be used. The main building will be the largest wood-truss structure built in Michigan in many years. Engine test cells will be made of reinforced concrete, the only exception to the wood-construction rule.

Announcement of this engine manufacturing plant by C. J. Reese, Continental president, is only one of several engine manufacturing plants announced in the immediate past. One of these, for The Aviation Corp., will be used for the manufacture of a new liquid-cooled airplane engine that has a horsepower rating considerably greater than that of any other liquid-cooled engine now in production for aircraft, according to word recently from William F. Wise, exec-

utive vice-president of Aviation Corp. This new engine will be built by Liquid Cooled Engine, a new division of Aviation Corp., for the United States Navy and will be the first liquid-cooled engine used by the Navy in this war. It is understood that the horsepower is in the range of the largest type air-cooled engines now in production. Development has been for and with the cooperation of the Navy at the Lycoming Engine Division, Williamsport, Pa. This plant will be located in Ohio.

Aircraft engine development is by no means at its peak, if one listens to the engineers who are intimately concerned with the problems of projecting future designs. Recently there was a discussion in Detroit of the new forged cylinder head developed by Wright Aeronautical Corp., and it developed that some engineers are of the opinion that further serious consideration should be given to the permanent mold casting of aircraft engine heads. The rivalry of engineers who want to produce better parts, easier to manufacture, may bring developments along this line before the war is brought to an end, or after peace again gives time for more leisurely research. There already has been some work on an attempt to combine centrifugally cast cylinder barrels with readily forged heads, the combination giving great promise of simplification of manufacture.

AGAIN come predictions about post-war America, this time from Frank W. Curtis, of Van Norman Machine Tool Co., and past president of the American Society of Tool Engineers. Automobiles and airplanes are two outstanding products that will derive the benefit of scientific research, Curtis predicts, adding that it is his belief that aluminum and magnesium will compete with steel for many purposes, especially in automobiles, and that plastic materials will find many peace-time uses. A fuel, many times more powerful than gasoline, has been produced, Curtis said recently, which will require entirely new automobile engines because present designs are not able to use it. The fuel is of a very high compression type that will require a small, high-speed motor, resulting in greater power per

pound of weight than present motors. Such motors, he added, will introduce a new era of civilian flying.

Curtis also declared that management has come to realize that tool engineering is the backbone of successful manufacture.

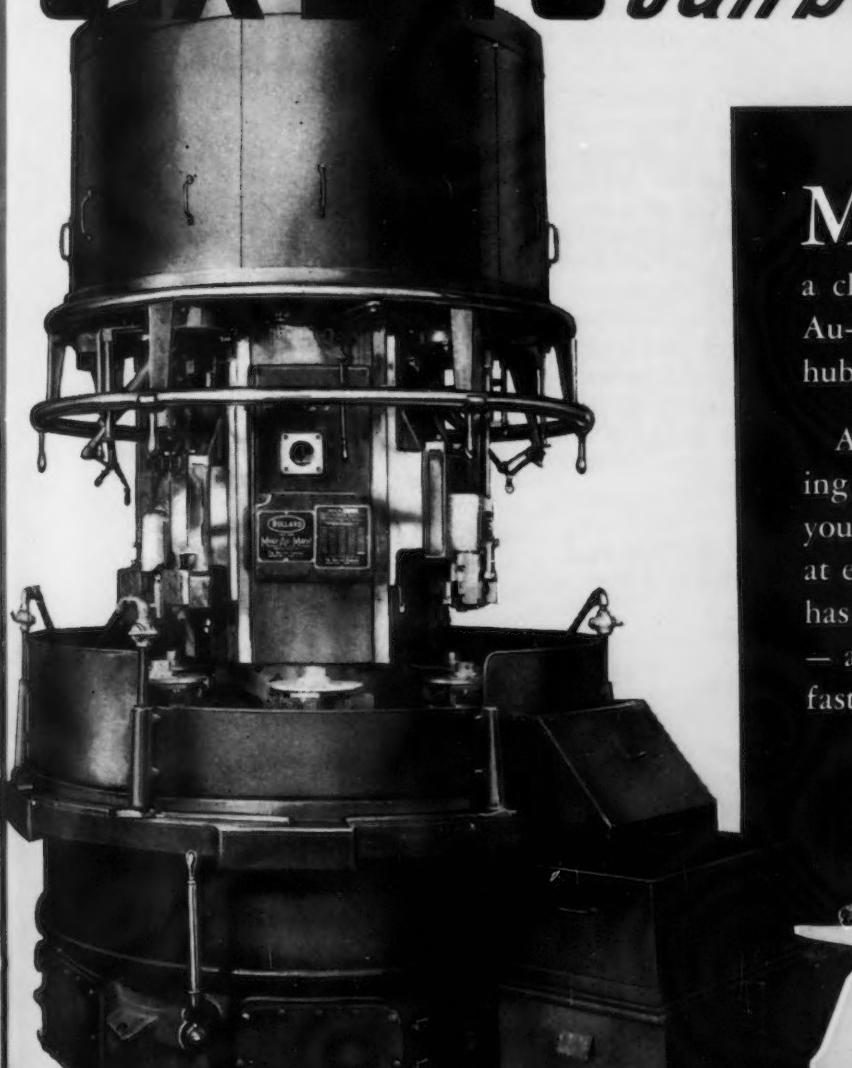
"Through the close study of manufacturing methods, almost any type or style of product can be made interchangeably, even though the output may be considered relatively small," Curtis declared. He likened the use of modern machines with inadequate tooling to "hitching a race horse to a plow." The tool engineer, as a partner to the designer, can serve by picking apart a design, piece by piece, enabling re-design, if necessary, to conform with modern manufacturing practices, Curtis advocated.

Production engineering technique is indeed the key to mass production of war goods, and on that basis management is continuously on the outlook now for suggestions that improve shop practices. Some of them have heard recently of a worthwhile method of saving time and improving the care of perishable tools. It was developed by a firm doing machine work on aircraft engine parts. The system is intended to provide to each machine operator all the tools necessary to keep his job running for a definite period, for instance, an entire morning or an entire afternoon. This eliminates the necessity for the machine operator to make numerous trips to the tool crib during the day. He is furnished at the start of the period with a complete set of tools, packed in a wooden box; upon completion of the day's work he returns the complete stock of tools to the tool crib. (This does not mean that the tools set up in the machine are torn out at the beginning or completion of each shift, as only the surplus tools are returned.)

ON some machine operations, such as screw machines, all the tools required for a single job are mounted on a panel which has handles on it. A complete panel can be moved from one job to another.

The fact that the tools are in boxes or containers has a psychological value in that it encourages the workers to take better care of them. This same psychological ap-

'SIX BITS' can be a Whole Lot!



MAYBE not much in a bank, but the story is different here! It is a close-up of the stations on a Multi-Au-Matic which is set up to machine hub plates.

A Multi-Au-Matic has seven working and one loading station — with your choice of speeds, feeds and heads at every station. And as noted here, it has the power to drive six bits or more — at any or every station if that's the fastest and best way to handle the part.

ONLY MULT-AU-MATICS
HAVE ALL THESE FEATURES

- 1. 8 Stations
- 2. Independent Speeds and Feeds at Each Station
- 3. Horizontal Chucks
- 4. Minimum Floor Space
- 5. Automatic Operation
- 6. Easy Changeover
- 7. Continuous Flow Lubrication
- 8. Interlocking Safety Devices
- 9. Easy Tooling

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

ON THE ASSEMBLY LINE

proach, and also a very practical one, is used in caring for precision inspection tools. The use of a rack or specially fitted box for the inspection tools influences the inspector to treat them with a little bit more respect. Moreover, the practical aspect is that it provides a place for the gages and tools so they are not piled on top of one another on a bench, and thereby knicked or scratched. Where inspections are made at the machine by the operator, it is becoming the practice to provide a rack at the machine for each of the gages used.

In an interchange of ideas between engineers in the automotive industry, two suggestions for template making, particularly adaptable in aircraft work, were tossed on the table recently. One of them is the use of an offset printing process and the other is an etching process, similar to that used in making electrotype plates for printing. Another idea used by one firm and likely to be adapted by others is in the precision grinding of aircraft parts: to avoid the formation of grinding cracks, plunge grinding has been found to give most satisfactory results.

All records for production of Browning machine guns by the AC Spark Plug Division of General Motors were smashed in the month of May, according to George Mann, Jr., general manager. Machine gun manufacture at AC was started in April, 1941.

It is probable that this is the company referred to in "The Job

Is Being Done," a six-months-after-Pearl-Harbor review published by the Automotive Council For War Production. In the review it is reported that one automotive company, in collaboration with Ordnance engineers, has worked out manufacturing methods to cut 25 per cent from the time required to make machine guns.

BECAUSE the time savings introduced by tooling are playing such an important role in speeding production and lowering costs, some more examples might be of interest. For instance, the automotive firm which reduced a single process in the production of cannon from three and a half hours to 15 minutes; the automotive producer of air frames which cut the man-hour requirement on one bomber wing and nacelle job by more than 50 per cent; and the firm which used automotive machines and tools for a wing panel job with a saving of 75 per cent in time and more than \$1,000 per bomber in cost.

Since the automobile industry is engaged to build 75 per cent of all aircraft engines, more than half of the diesel engines for the Navy, more than one-third of the machine guns for the armed forces, more than 40 per cent of the tanks and parts, all of the motorized units, and hundreds of other items, including cannon and artillery components and shells, as well as bombers and fighters and airframe sub-assemblies, the total of the time savings may well—in the

long run—spell out the winning of the war.

Announcement has come in the past week from E. F. Fisher, general manager of Fisher Body Division of General Motors, that anti-aircraft guns are in production in Fisher plants five months ahead of schedule. These are large caliber weapons with a range (altitude) of approximately seven miles. The gun is mobile, shoots an explosive shell, and can be fired by remote control. The project of manufacturing the gun is divided among several Fisher plants and special tools have been designed for the job.

The accuracy required in this gun is indicated by the fact that a variance of a thousandth of an inch in some parts of the gun will cause the projectile to miss its mark by more than 60 ft. at a range set up in the specifications.

FOR use in its own plants, Fisher has developed a unique maintenance unit for emergency service in the event of bombing. This unit is mobile, being mounted on an electric truck chassis similar to that used in many plants for materials handling. It is equipped to clear away debris and make repairs so plant operations can be continued. Carried in compartments on this special truck are tools such as jacks, shoring timbers, crowbars, chains, acetylene welding and electric welding equipment, spot lights, etc. This type of unit might have use in any plant where interruptions in production because of bomb damage must be avoided.

Kok-sagyz seed, mentioned in this column in April, are being shipped to this country for experiments leading to the production of rubber from the Russian type dandelion, according to William O'Neil, president of General Tire and Rubber Co. The first seeds are being sent by airplane so tests may be conducted during the 1942 growing season.

Whether justified or not, there has been a lot of optimism expressed about the rubber situation ever since Willard H. Dow, president of Dow Chemical Co., Midland, Mich., broke the news a few weeks ago that Thiokol might provide a plentiful supply of rubber-like material for retreading tires before many months.

THIS ONE WON'T BITE AGAIN: This heavy Jap cruiser of the Mogima class was demolished by Navy bombs in the battle off Midway. Armor plate, steel decks, and superstructure are a tangled mass.



**BULLDOG
"PLUG-IN" LIGHT AND POWER
DISTRIBUTION SYSTEMS**

**READY FOR ANY
PRODUCTION CHANGE
from Peace to War...and Back**

Today's accepted best in power and light distribution systems is parallel runs of BullDog BUStribution DUCT for power, and Universal Trol-E-Duct for lighting. Together, these systems take power and light right to individual machines . . . furnish ideal production conditions throughout your plant.

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Pioneered by BullDog here in the home city of mass production . . . developed for mass production by mass production experts . . . BullDog Bus Duct Systems are engineered to save architects' time, contractors' time, executives' time, production time, maintenance time.

Plants which already have this BullDog equipment have found it expedites tremendously conversion to war products manufacture. Equally important . . . the change back to peace conditions will be just as quick with the change back to flexible, 100% salvable, pre-fabricated BullDog equipment.

Use Your Local BullDog Engineer

His knowledge of and experience with these systems qualify him to cooperate with your architect or engineer in drawing up and submitting complete detailed layouts and specifications.

BullDog BUStribution DUCT takes power right to the production line, with individual protective plugs for each machine, while the Universal Trol-E-Duct provides completely flexible and adequate lighting . . . when and where needed.

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ORIGINATORS OF FLEXIBLE ELECTRICAL DISTRIBUTION SYSTEMS FOR LIGHT AND POWER

Washington . . .

• Steel industry, experimenting on sponge iron for almost a century, is told at Truman Committee hearings that this process has been suppressed . . . WPB "steel policy" is made by \$1-a-year men, Senator contends.



WASHINGTON — The steel industry is to be put on the Senatorial grill again. Taking out time in these days of tense preoccupation with war production to undergo another quiz, this time at the hands of Senator Truman's Committee, may not have broad appeal. On the contrary it probably strikes the country generally as being particularly unfortunate. Certainly this premise has support in the standard and sound slogan that time is short. And time is the essence in view of the existing crisis, more serious than ever for the allied nations.

Yet if the Senators want to keep grass from growing on the well trodden path that leads business men before investigating committees that may be a good thing. It may save mowing that probably would be done after the war. Investigating is a good thing. But like many good things it can be overdone. Congress has made and is making numerous investigations of industry and government agencies in relation to war effort. Some have been productive of good. The reverse is true of others.

IN any event the steel industry long has become used to investigations and will survive others. It certainly should not have dif-

ficulty in answering adequately the questions Senators say they are concerned about. The Senators who seem to be principally interested are Senator Truman of Missouri and Senator O'Mahoney of Wyoming. The questions relate to a matter that the industry does not fit into the war picture. But the Senators do. Hardly would the subject of investigation occur to the industry at this time.

For it concerns the strange charge by Senator Truman that the sponge-iron process is being suppressed in the War Production Board, whose "steel policy", he says, is controlled by \$1 a year men from the steel industry. Soon after the steel industry was panned by the Senators, Phillip Murray, head of the CIO United Steelworkers of America, broke out with old charges that the industry was laggard in utilizing its war facilities to the full. This blast might require the industry to take further time out from its war job to reply to labor politicians.

SENATOR TRUMAN said that he had received plenty of evidence that the sponge iron process is being suppressed by the WPB, whose materials section "sponge iron expert" was told to make a reply to the charge. The "big \$1 a year men in WPB" from large steel companies are held up by the Missouri senator as the bogey men who have suppressed the sponge iron process. Just why they would if, as Senator O'Mahoney claims, sponge iron can be produced at \$5 a ton less than the cost of producing pig iron, is a puzzle. Most people would reason that the cheaper the steel industry can get raw material for the manufacture of steel the better they would like it.

The truth is that the steel industry long has experimented with the sponge iron process and spent millions of dollars in doing so. Experimentation still is under way. The industry never has been able to develop the process on the commercial basis in this country. WPB itself has approved a "pilot plant" for producing sponge iron. This experimental plant is in operation under conditions that were made as favorable as possible. It has a local combination of a special ore and ample supplies of natural gas for

fuel. Two private plants in Texas are trying to develop the process.

Director R. R. Sayres of the Bureau of Mines has been quoted as saying that several processes "show promise of commercial success" and that commercial sponge iron plants should be installed with a minimum of delay to make up for the approaching shortage of "scrap." Obviously this would mean the use of a lot of steel, whose so-called shortage is so loudly deplored by the Senators, as well as labor, for the erection and operation of plants. And in the opinion of WPB they would be only experimental plants. They insist that the process of making sponge iron in this country still is in the laboratory stage.

Hardly will the Senators or anyone else claim that William L. Batt, WPB Materials Director, has tried to suppress steel expansion. As is well known, Mr. Batt has been an ultra-expansionist in the field of steel and other metal lines.

But Mr. Batt doesn't go along with the Senators on the practicability of attempting to establish a sponge-iron industry.

Senator O'Mahoney himself made this clear. In the course of his testimony favoring establishment of a sponge iron plant "at the mouth of every ore mine in the country," the Wyoming Senator placed in the record of an Agriculture Subcommittee, a statement by Mr. Batt.

"All the sponge iron processes were reviewed by our people recently, but all save one were discarded as impossibilities," said Mr. Batt. He added that in the one case "no great hopes are entertained . . . and it is being tried to make sure we are exhausting all possibilities." One source said an outstanding difficulty is that domestic ores seem not to be adaptable to the process so far as it has been developed.

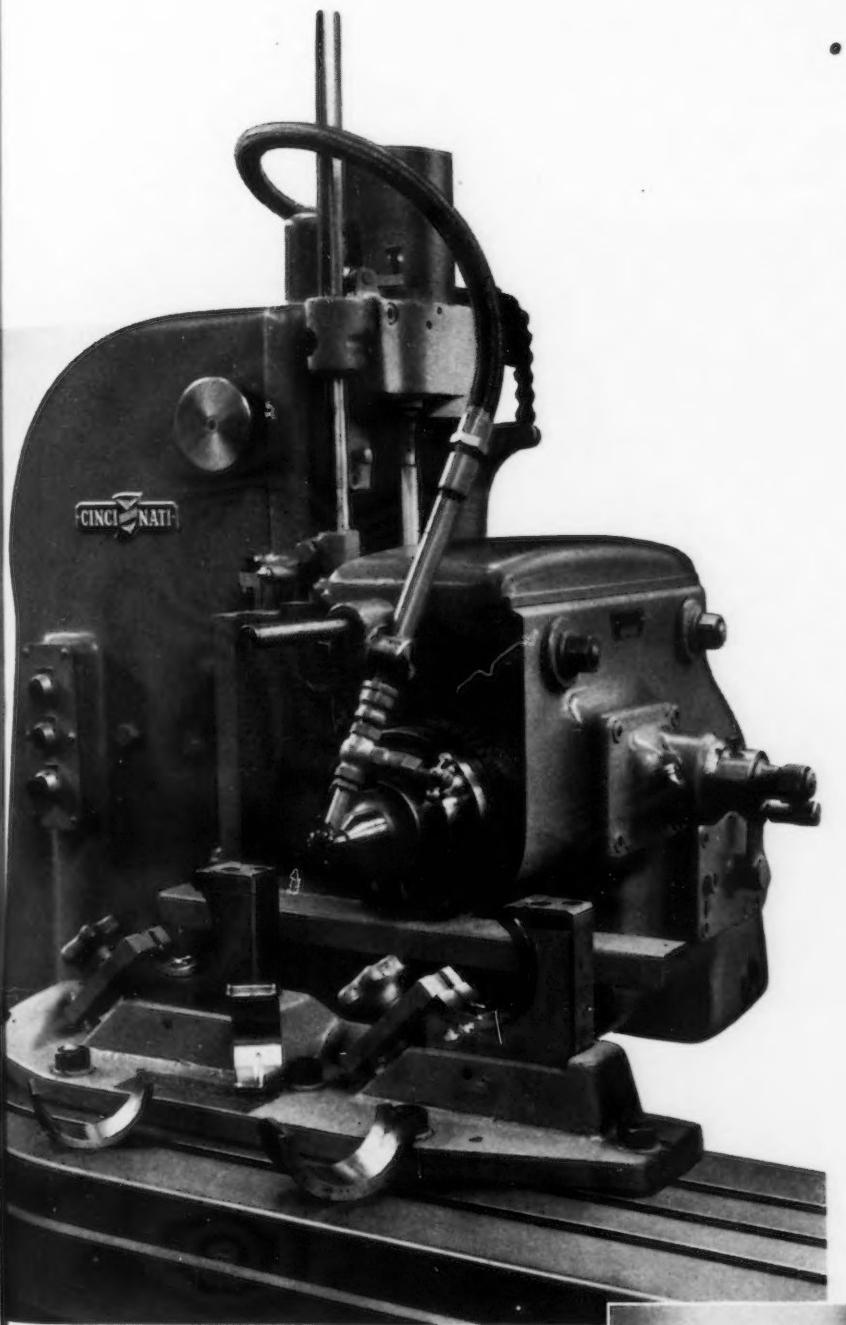
The difficult problem of developing a commercial sponge iron process is an old one and is clearly set forth in the "Making, Shaping and Treating of Steel."

"From 1850 and up to the present time, much money has been spent in vain attempts to develop a direct process that would be practicable and able to compete with the indirect processes for manufacturing

This Equipment

MILLS TWO OIL-GROOVES ON A RADIUS

. . . In 43 Seconds



Right: CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine.

Oil grooving is a rather commonplace operation in shop practice until the groove must be milled on a radius. Then it requires a bit of head-scratching to figure out a rapid method that will give uniform results.

The bearing caps in the illustration above require two oil grooves about $15/16''$ long, on the inside bore. Quite obviously, the machine illustrated — A CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine — has no mechanism for circular milling, but this effect is produced by the cam controlled rise and fall spindle carrier. Thus the oil grooves are milled on a radius, with a standard production machine.

The fixture holds two parts in tandem. After the first oil groove is milled, the spindle carrier automatically rises to clear the fixture, the table advances to the next cut, and the carrier rapidly lowers to milling position. Both oil grooves are milled in 43 seconds. Parts are removed and replaced during the milling cut.

Perhaps many of those difficult and slow production parts in your shop could be milled faster and more accurately on a CINCINNATI No. 2-24 Milling Machine. Catalog M-909 gives you the complete story of these machines.



WASHINGTON NEWS

wrought iron and steel," says this high authority.

IN Sweden alone does the process seem to be successful and is attributed to the country's high grade ore.

"Conditions, economically and metallurgically, appear to have been most favorable to sponge iron production in Sweden where in 1928 the Hoeganaes Co., at Helsingfors, alone, had a capacity of 15,000 tons per year," says the "Making, Shaping and Treating of Steel." "Here the Sieurin process is used. In this process, ore concentrates of high purity, coal, and lime are charged in layers into covered crucibles, which are heated in kilns until reduction is complete and cooled, when the iron is removed in the form of a round porous cake about 10 inches in diameter and 2 to 2½ inches thick."

This small Swedish production indicates the difficulty of the operation and for war purposes it is so infinitesimal that it is not worth considering.

A steel production expert pointed out that the American industry is thoroughly conversant with the numerous processes for the direct reduction of iron ores to make

purer iron to compete with the standard blast furnace process of making pig iron, but he said that as yet direct reduction methods have not been developed for the production of more steel, better steel or cheaper steel.

Machinery Shipments Rise By 300 Units in May

Washington

• • • The value of new machine tools, presses and other metal working machinery shipped during May was \$118,500,000, the WPB announced last Friday. Shipments of machine tools alone amounted to 25,700 units, with a total value of \$107,300,000. During April, 25,400 units, valued at \$103,364,000 were shipped.

Production of metal working machinery has reached a rate of more than \$1,400,000,000 a year and is steadily on the increase. Last year the value of metal working machinery was about \$840,000,000 and the present going rate represents an increase of more than 65 per cent. Compared with the same month of last year, the May value for all metal working machinery is an increase of 80 per cent.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



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Army Lists New Building Projects

The War Department announces:

1. Authorization for construction of an Air Force Training School at Walnut Ridge, Ark., to cost in excess of \$3,000,000. Construction will be supervised by the Memphis, Tenn., district office of the Corps of Engineers. In connection with this project, a lump-sum construction contract has been awarded the Forcum-James Co. of Dyersburg, Tenn., and a contract for architectural-engineering services has been awarded Hadens & Emerson of Cleveland.

2. Authorization for the construction of an Air Force Installation at Pratt, Kan., to cost in excess of \$3,000,000. Construction will be supervised by the Tulsa, Okla., district office of the Corps of Engineers.

3. Authorization for the construction of an Air Force Installation at Liberal, Kan., to cost in excess of \$3,000,000. Construction will be supervised by the Tulsa, Okla., district office of the Corps of Engineers. In connection with this project, a lump-sum contract for architectural-engineering services has been awarded the Guernsey-Midwest Engineering Corp., and Parr and Aderhold, joint venturers, Tulsa, Okla.

4. Authorization for the construction of a military installation at Rapid City, S. D., to cost in excess of \$3,000,000. Construction will be supervised by the Fort Peck, Mont., district office of the Corps of Engineers. In connection with this project, a fixed-fee contract for architectural-engineering services has been awarded Hugill and Blatshwick, Sioux Falls, S. D.

5. Authorization for the expansion of a manufacturing plant in Indiana, to cost in excess of \$3,000,000. Construction will be supervised by the Chicago district office of the Corps of Engineers.

6. Authorization for the construction of a military installation at Shenango, Pa., to cost in excess of \$3,000,000. Construction will be supervised by the Chicago district office of the Corps of Engineers. In connection with this project, a contract for architectural-engineering services has been awarded Gannett, Eastman and Fleming, Harrisburg, Pa.

7. Award of a lump-sum contract for architectural-engineering services to Black and Veatch, Kansas City, Mo., in connection with an Air Force Training School at Independence, Kan., to cost in excess of \$3,000,000. Construction incident to this project is under the supervision of the Tulsa district office of the Corps of Engineers.

8. Award of a negotiated contract to McMillan, Glover & McCullough of Lubbock, Texas, for construction and architectural-engineering services, in connection with an Air Force installation at Lubbock, Texas, to cost in excess of \$3,000,000. In this connection, construction will be supervised by the Albuquerque, N. M., district office of the Corps of Engineers.

9. Award of a negotiated construction contract to the A. J. Rife Construction Co. & Associates of Dallas, Texas, in connection with an Air Force Training School at Dalhart, Texas, to cost in excess of \$3,000,000. Construction incident to this project is under the supervision of the Tulsa, Okla., district office of the Corps of Engineers.

10. Authorization for the construction of an Air Force Training School at Blackstone, Va., to cost in excess of \$3,000,000. Construction will be supervised by the Norfolk, Va., district office of the Corps of Engineers.

Wooden Beds to Replace Army's Steel Folding Cots

Washington

• • • A specially designed wooden bed will replace the present steel folding cot in all future Army purchases by the Quartermaster Corps, the War Department has announced.

HOW TO DESIGN AND GRIND CHIP BREAKERS FOR CARBIDE STEEL-CUTTING TOOLS

Since Carboly tools operate at speeds usually several times faster (generally in excess of 200 F.P.M.) than high speed steel tools, the problem of economical, safe, chip disposal is one that must be considered when employing carbides for cutting steel. Ordinarily, when machining steel, a continuous chip is produced. Easy chip disposal requires that this continuous chip be broken into

9 Styles of Standard-Stock Tools Available for Cutting Steel

Carboly Standard Tools—stocked for prompt delivery—include nine styles furnished in grades for cutting steel. Adaptable to 80% of all turning, boring, facing jobs, Carboly standards can be quickly converted—in your tool grinding room—to special shapes required. One large mid-western plant, for example, uses just 9 Carboly standard styles for 89% of all carbide tool applications in the plant. This standardization has resulted in lower tool inventory, reduced tool costs, and has enabled them to get carbide tools on the job fast. No delays awaiting deliveries of special shapes... they make their own specials by adapting standards.

Here is a typical example: Machining cast steel reduction gear blanks for the main drive of destroyers (see cut). 14 specially shaped tools required. Ordinarily that means several weeks of waiting. But this plant takes just four styles of Carboly standards from their stock, grinds them to the 14 special shapes in an average time of less than 10 minutes per tool!

In this emergency period—when every minute counts—Carboly Standard Tools, more than ever before, are of utmost importance to your plant. Send for catalog GT-140-R.

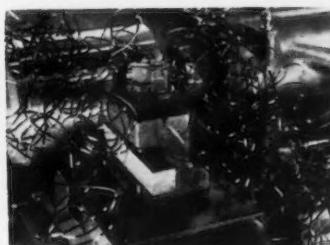


One user "makes" 14 special carbide tools for this job in less than 10 minutes per tool

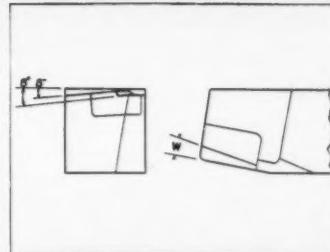
relatively short lengths that can be readily removed from the machine. The most widely used type of chip breaker for this purpose is the ground-in step-type breaker.

A general guide to the design and grinding of this type is shown below. Further details are contained in the 32 page Carboly Tool Manual, available free upon request.

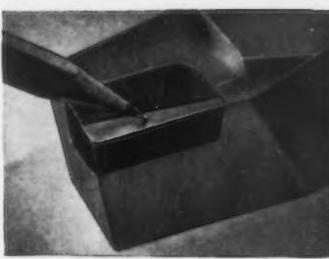
DESIGN HINTS



At the high cutting speeds common with Carboly tools, chips present a problem in safe, economical disposal.



The ground-in step is the most widely used type of chip breaker. Recommended for practically all kinds of steel cutting jobs.



RECOMMENDED WIDTH OF CHIP BREAKER (W)

FEED In. Per Rev.	.008-.012	.013-.017	.018-.022	.023-.027	.028-.032
Depth Cut Inches	1/64 - 3/64	1/16	5/64	3/32	7/64
1/16 - 1/4	3/32	1/8	5/32	11/64	3/16
5/16 - 1/2	1/8	5/32	3/16	13/64	7/32
9/16 - 3/4	5/32	3/16	7/32	15/64	1/4

NOTE: A chip breaker depth of .028 is satisfactory for most types of steel.

In step-type chip breakers, it is desirable to have same rake angle on both the top surface of tip, and chip breaker.

Usually adjustments only in width of breaker are necessary. This table is general guide to correct widths for various feeds and depths of cut.

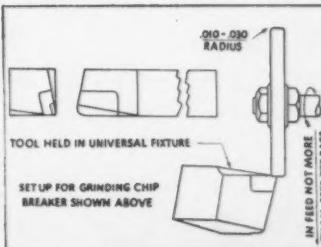
GRINDING HINTS



Make sure that all tool angles have been rough and semi-finish ground to desired shape, and steel shank relieved behind tip.

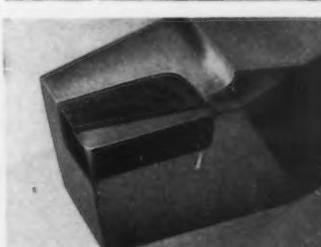


Then set up tool in universal vise on a cutter, surface or chip breaker grinder. Use a 100 grit resinoid bond diamond wheel.



Use kerosene or soluble oil, applied with wick, to keep diamond wheel open. Grind full width of breaker. Use down feed, not exceeding .0005 per pass.

Finish grind tool shape after breaker is completed. This removes any minute nicks developed during breaker grinding.



Send for free 32-page Carboly Tool Manual

CARBOLOY COMPANY, INC.

11153 E. 8 MILE RD., DETROIT, MICH.

Chicago • Cleveland • Los Angeles • Newark • Philadelphia
Pittsburgh • Seattle • Worcester, Mass.

Canadian Distributor: Canadian General Electric Co., Ltd., Toronto, Canada



CARBOLOY

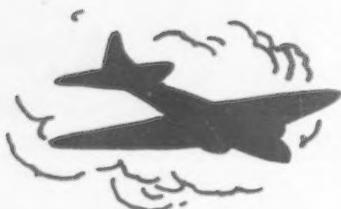
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CEMENTED
TOOLS • DIES • DRESSERS
CORE BITS • MASONRY DRILLS
• WEAR RESISTANT PARTS •
CARBIDES

FOR THE MANUFACTURING • MINING • TRANSPORTATION • CONSTRUCTION INDUSTRIES

WEST COAST . . .

• With warehouses unable to replace steel stocks, war effort is jeopardized . . . Higher and higher priority ratings have created "inflation" . . . Ickes wins approval for laboratory.



SAN FRANCISCO—Rapidly diminishing Pacific Coast steel warehouse stocks coupled with loading of Coast mills with directives may well create a serious delay in marine and industrial repairs and conversions. Had Coast warehouses been kept up to the level of 18 months ago, the Navy might even now be larger by several ships of a type whose value has been strikingly demonstrated.

Present conditions require conversion of merchant ships to this type of Naval vessel to lag while shipments are awaited from Eastern mills.

Production of the relatively small Coast mills, limited to a short range of products, is not finding its way into normal trade channels even on the highly rated orders. With the warehouses practically bare, this means that the nearest emergency sources of supply are situated far away.

Inability to secure stock replacements from Coast mills and distance from Eastern mills has worked to the disadvantage of local warehouses, for although they had a larger proportion of high rated sales they received less in proportion to their quotas than warehouses in the remainder of the country.

Part of the trouble of the local warehouses can be traced to the important role they played in making possible the metamorphosis of the Far West from peacetime light industry to wartime heavy indus-

try. Whatever their shortcomings may be, the warehouses enabled many shipyards to get into production without waiting for shipments from Eastern mill sources. The warehouses never have been able to replace this steel. At the time these sales were made, the warehouses had no priority ratings for stocks purchases, and regulations at that time did not allow them to extend ratings for stock replacements. The A-9 rating finally provided last September was "too little and too late."

In the last three months of 1941, mills were able to supply Coast warehouses little more than two-thirds of their quotas based on the first quarter of that year. During the first quarter of 1942, these warehouses still got less than three-quarters of their quotas and found their stocks evaporating about one-sixth again as fast as they were being replenished. Lately this excess of sales over stock replacements has grown 20 to 35 per cent.

As previously reported in this column, mill depot stocks of Bethlehem and Columbia, dominant mill operators in the Far West have practically vanished and, in some cases, the buildings turned over to other purposes. Counting the loss of these stocks along with those of the barren, independent warehouses, a reliable estimate is that there has been a decline of more than 80 per cent in the steel which was available for spot delivery in this section at the end of 1940.

To some extent this condition can be blamed on acceptance of too many unrated orders in the past. To a further extent, it can be blamed on the tendency of the War Production Board to dish out higher and higher priority ratings, creating a priority rating inflation not unlike the monetary inflation in Germany after the last war. . . when you try to cash in your rating you find its value has declined.

The school of thought which holds that warehouses are an uneconomic form of distribution will welcome their demise, recalling warehouses which have collected a profit on carload lots shipped direct from mill to consumer. Little crying will be done by mills which have

carried a high promotion cost on steel sold through warehouses prior to the war, and which have been swamped by the "paper work" required for sales to warehouses since the war began.

Whatever justification there may be for these points of view, it cannot be denied that the warehouses here have an extremely strong case. Their first argument, already outlined, is that they provide a "standby" stock for emergency requirements of industries located far from mill sources of supply. The warehouses refute the theory that steel on their floors is "dead" inventory. Instead, they say dormant stocks are eliminated because a number of small customers are enabled to purchase only their exact requirements as needed. Otherwise, these small buyers would be forced to purchase in larger quantities acceptable to the mills and, in the case of small war contractors and sub-contractors, to buy in excess of need to insure themselves against breaks in production schedule.

THE warehouses concede that they have obtained some relief through the use of Form PD-83-g in extending higher ratings than the present A-1-k on Schedule A items or A-3 on Schedule B items. This, however, only permits replacements of materials sold from already reduced stocks and does nothing to re-establish these stocks to working levels. Meanwhile, the necessity of filling lower rated orders reduces the stocks faster than they are replenished.

As yeast for this run-down condition, the Coast warehouses propose that the use of Form PD-83-g be revised so that they can purchase 50 per cent in excess of the quantities sold on ratings higher than A-1-k or A-3 until their stocks take on a more healthy look and are able to go back to work as an active factor in helping war industry. All the steel obtained by this method would be earmarked and reserved for delivery on orders bearing ratings of A-1-j or higher, except when otherwise specifically ordered by the director of industry operations.

Planned aluminum reduction capacity in the Far West took another jump last week when it was con-

20

Rushing More Tools to Machines of War . . .

FOSDICK

JIG BORER

With each new war production machine installed there must be a complete tool set-up or jigs or fixtures to insure the maximum output from each machine.

In and about one of our largest industrial centers Fosdick Jig Borers are doing a major job in Tool & Die Shops engaged in producing dies—jigs—fixtures and special tools for America's machines of war.

Illustrated is a Fosdick Jig Borer in one of these shops. The all-around utility and dependable accuracy of the Fosdick Jig Borer is indispensable on this type of work. Its economy on both production jobs and short runs is also worth investigating.



FOR FULL DETAILS WRITE FOR
JIG BORER BULLETIN J.B.A.
Built in two sizes
the 30 and 30A

FOSDICK MACHINE TOOL COMPANY
CINCINNATI . . . OHIO

NEWS OF THE WEST COAST

firmed that the size of a reduction plant nearing completion in eastern Washington will be tripled.

The strong determination of Secretary Ickes to industrialize the Northwest with electric power, even when war industry fades out of the picture, last week won Congressional approval for his \$500,000 electro-development laboratory to be located in that region. The ultimate goal would be to make economic the reduction with electricity of domestic minerals.

WHAT has been the war's one real substitute material to date—wood—found another use last

week when the Army ordered eight Pacific Northwest firms, headed by a large furniture factory, to build wooden cargo trucks at a substantial production rate. The policy of using wood instead of steel on all cargo body trucks of one and a half tons capacity or larger will save approximately 275,000 tons of steel a year if it is carried out on the anticipated scale.

Wooden shipbuilding took another jump when the Columbia Shipbuilding Co., an Oregon firm, won a maritime commission contract for five barges and six tugs.

Meanwhile, victims of the M-126 order unable to convert to war

production were offered possible reprieve by the posting at the San Francisco WPB Substitutes Display of a list of articles needed in substantial quantities on the Coast. Wholesale outlets were offered for these articles made of substitute materials:

Awning frames and supports, bath tubs, cabinets, canopies for electric brooders, cans and containers for 20 miscellaneous articles, chicken crates, chick feeders, clothesline reels, clothesline pulleys, clothes racks and dryers, door handles, drawer pulls, feed troughs, fence posts, flower boxes, pot holders and vases, furniture.

Grain and storage bins, garbage cans, cutters, spouting, conductor pipes, house numerals, lockers, mail boxes, material for housing, milk bottle cases, novelties and souvenirs, park and recreational benches, plant and flower supports, pleasure boats, poultry incubator cabinets sign posts, table tops for household use, tanks—dipping, watering, feeding, storage; tool boxes, waste baskets, wheelbarrows, and pails.

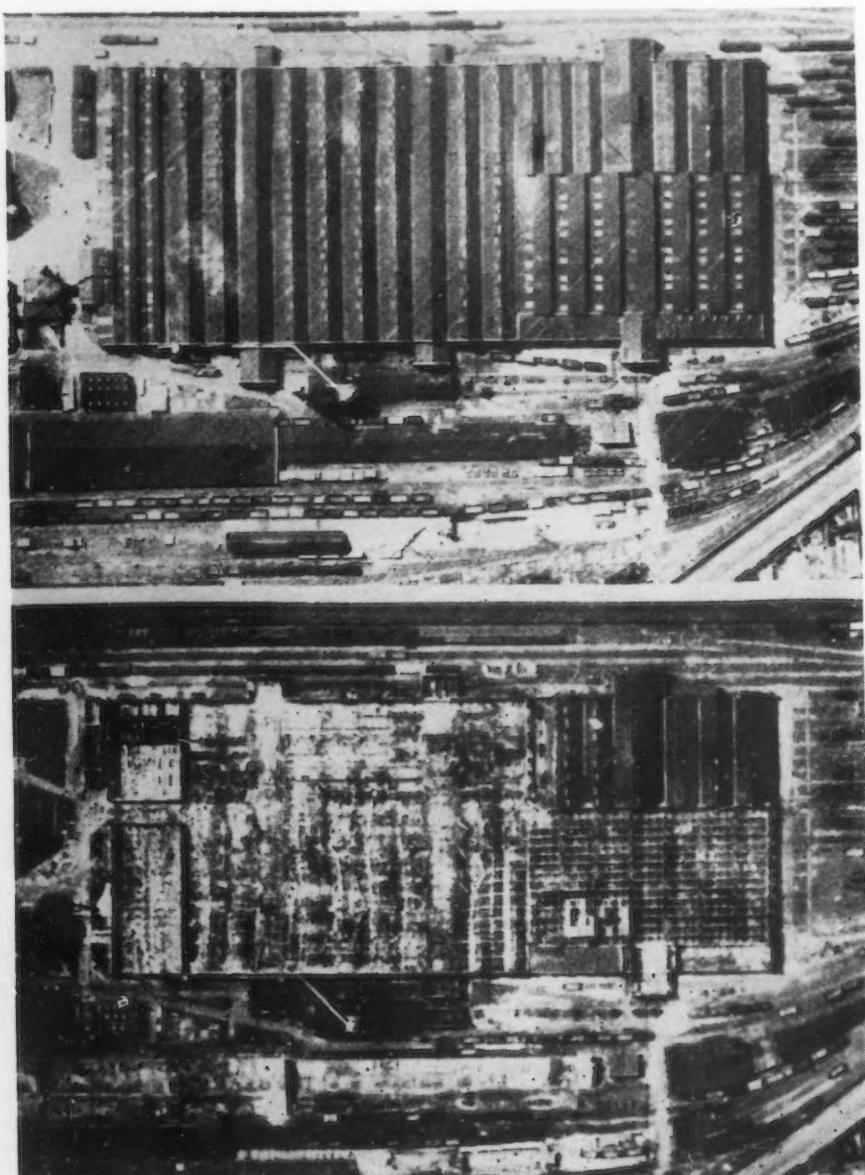
Substitution in the labor fields is broadening, too. Current demand at the Los Angeles United States Employment Service office for women now is concentrated on those who have had training or experience for drill presses, precision assembly, spot welding, riveting, and machine shop operations. Even if the women have had no experience, jobs are open.

Help wanted columns in local newspapers contain many openings with Midwestern or Eastern industrial firms who apparently have the idea that the labor supply factor on the Coast is greener than on their own side of the fence. The fallacy of this belief is illustrated by the estimate that California will have a shortage of 8500 welders by August, even if all the training schools expand to their possible limits. Plans are being laid to recruit some of the necessary welders from the Rocky Mountain states, but this involves laying an extensive training program there in advance.

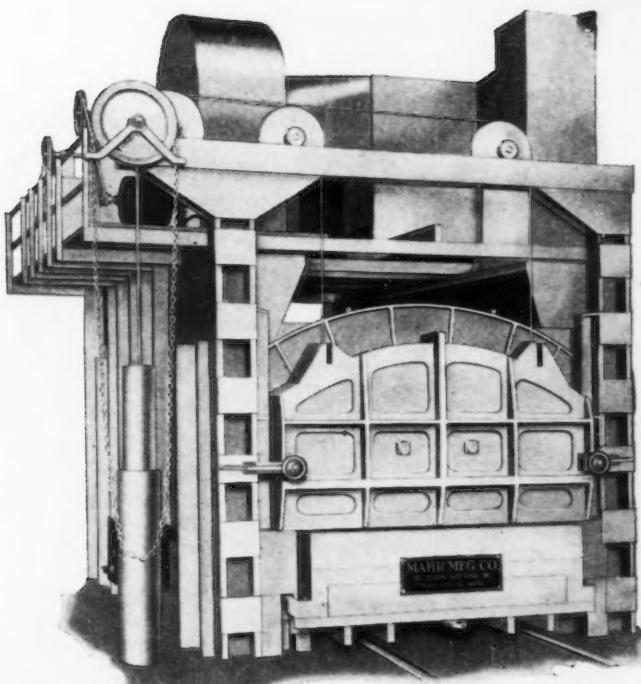
Army Adopts New Chrome-plated Mess Tray

Washington

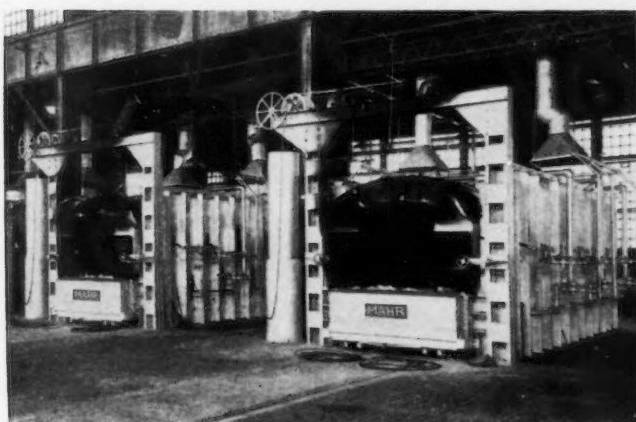
• • • The Army has designed a new mess tray made of chrome plated, sheet steel, which replaces stainless steel, a critical material.



HOW DO TANKS GET THAT WAY?



MAHR recirculating air draw-stress relief furnace.



MAHR car bottom Carburizing furnaces for Carburizing armor plate.

COLOSSUS OF TODAY'S BATTLEFRONT—Behemoth of ruggedness and well-nigh irresistible power—precision motored, ultra offensive—yet, like the ponderous tortoise, dependent upon its *shell* for protection from enemy assault!

American tank manufacturers today are using many MAHR Carburizing and air draw-stress relief furnaces for perfecting the super armor of modern tanks. MAHR continuous, car and batch type furnaces are also used extensively for the critical heat treatment of tank transmissions to give them dependable, rugged driving power. That's because, through the years, MAHR furnaces have always been on the front line of heat treating progress in *every* phase!

FOR EVERY HEAT TREATING NEED

ANNEALING, CARBURIZING, BAKING, HARDENING, FORGING, DRAWING, STRESS RELIEF—CAR BOTTOM, PIT, PUSHER, ROLLER HEARTH, CONTINUOUS, POT . . . RIVET FORGES, TORCHES, BURNERS, BLOWERS, VALVES.

WRITE, WIRE OR PHONE TODAY

Our engineers will gladly help you select the type unit you need, and we'll give you complete information on any specific request. There's an engineer-representative near you for quick consultation.

**MAHR MANUFACTURING CO.
DIV. DIAMOND IRON WORKS, INC.**

GENERAL OFFICES—MINNEAPOLIS, MINN.
SALES OFFICES IN PRINCIPAL CITIES

Fatigue Cracks

BY A. H. DIX

Sulphite Flood

• • • The paper shortage you heard so much about a couple of months ago has given way to a paper plethora. Many paper mills are now operating part time through lack of orders. The waste paper collection campaign has been so embarrassingly successful that the country faces the fate of the erring mother in East Lynne's snowstorm scene.

One of the reasons for the falling off in demand is the abnormal length of Washington addresses. Typists' output has been so slowed up by this factor that the whole paper industry suffers. Let us take a Washington address—not a typical one, as that might spoil our point—but a long one (this example supplied through the courtesy of the Los Angeles Chamber of Commerce):

Mr. Charles Levitt, Assistant Chief,
Wine Division, Beverages and Tobacco Section
Division of Industry Operations
War Production Board,
Fifth Floor, Sixth Wing,
Railroad Retirement Building,
Southwest Corner 10th and U Streets, N.W.,
Washington, D. C.

That is three times the length of a normal address. Therefore, the production rate in typing Washington addresses is 67 per cent below the average. This is more serious than it seems. Not only is paper consumption affected, but the whole armament program is slowed up. The other day we got a letter from an important armament plant marked "Dictated 6/11/42, transcribed 6/18/42."

Armament plants write a lot of letters to Washington and we haven't the slightest doubt that the stenographic bottleneck is aggravated by the length of Washington addresses. Something should be done.

Code Remedy

• • • Having pointed out the ailment, we will prescribe the cure. All the WPB needs to do is to adopt a simple address code. Mr. Levitt's address could be shortened to:

Mr. Charles Levitt,
WPB, C-12-L
Washington, D. C.

The letter C designates the WPB's Division of Industry Operations, 12 indicates the Wine Division of the Div. of Ind. Op., and L the Beverages and Tobacco Section of the Wine Div. An address code chart in the post office would take care of mail delivery.

Next week we will solve the submarine problem.

From Bargee to M.P.

• • • His first job here was as a steeplejack putting up wireless masts. That was the first of a whole series of tough jobs, which included bargee, house painter, and chauffeur.

This is from page 104 of last week's issue, in which tribute is paid to W. Dennis Kendal, an English industrialist who has just become an M. P. It seems to us that the paragraph quoted is more colorful than correct. Even when gasoline was as plentiful as gin, chauffeuring could hardly be counted among the tough jobs. Nor would we class house painting among the arduous occupations.

But our chief complaint is the inclusion of the word *bargee*. We have never heard of a bargee. Our drug-store dictionary does not admit of the existence of a bargee. We would deduce that a bargee is someone who is barged in upon, but that is hardly an occupation.

We think that this etymological alien should have been introduced to the family circle, instead of being permitted to barge in unannounced.

Royal Greetings

• • • Five hundred persons were on the observation deck at LaGuardia Field when the former King of England arrived. Catching sight of the duchess over the tail of the Lockheed, he called, "Hell, darling . . ."

—New York Herald-Tribune

Probably got her dressmaker's bill by air mail.
—Deac

Blurb

• • • Six people have sent us clippings of the Sateve-POST's June 20 editorial page, which has an editorial captioned, "*The Iron Age Shifts Gears.*" Each one of them says in substance, "You ought to be able to make something out of this." We devoted an entire weekend to it but can't think of anything to say, other than "Why shift out of high?," which sounds obvious, prosy and smug.

We might, of course, hint that the brains department is moving so fast that it has automatically shifted into overdrive. In our biased way, we often wonder how long it can keep up the present pace without burning out a bearing.

Stopper

• • • Peg Allen's new coffee maker is helping to bring down Stukas—Revere Copper and Brass, Inc.

Erring Beauty

In the photograph on page 99, June 18 issue, showing a lovely lady operating a milling machine, the arbor is much too long, the ram-type overarm is improperly positioned, the wrong type of arbor support is used, and the young lady is wearing loose clothing which could very easily catch in moving parts.

—J. H. Dugan, Cleveland Heights, O.

But her permanent is flawless.

PRP Instruction Book Now Ready

• • • We are happy that our brains department occasionally does something that is brilliant, but we are happier that it always does the obvious thing. For example, there is an obvious need for an instruction booklet on the new PRP plan, so the brains department has just brought one out. In its twelve pages is practically all the worthwhile information at present available on the operation of the Production Requirements Plan.

The title of it is, "How to Operate Under PRP." It supplements the priorities guide and sells for 25c in quantities of one to ten, down to 10c a copy in big quantities.

Aprononym

• • • A small town in Ohio has, or had, an undertaking firm named Doom Brothers.

Puzzles

• • • The solution to last week's boat problem, as submitted by H. Kelsea Moore, Jr., is: (a) 10 miles, (b) 8.66 miles, (c) 17.32 miles, and (d) 112.5 min.

We wish that people who send in problems would give us all the right answers. R. Wade Bowman and Lt. Com. Simpson found another correct answer to the June 18 problem (the one about doubling a fenced in area with the fewest number of additional boards). They arranged the 20 boards in the shape of a triangle, with 9 on one side, 6 on the other, and 5 on the third. By leaving the 6 and 5 intact, and adding two to the nine to make two more sides like the original 6 and 5, the area is exactly doubled.

Par on this is twelve seconds:

A man six feet tall, stands six feet from a vertical plane mirror. What is the height of the smallest mirror in which he can see his entire image?

If the same man is twelve feet from the mirror, what would be the effect on the size of the mirror?

The combination of unusual flexibility, exceptional ease of control and high economy gives the Hi-Lift Hoist a wide usefulness. Sturdy construction makes it always reliable.

The load, large or small, is under the accurate control of the operator. He can lift, carry and spot with precision.

Hi-Lift Hoists are in use in every type of industry—steel mills, automobile plants, foundries, machine shops, tool and die shops, paper mills, structural plants, power plants and many other places.

They are handling dies, castings, machinery, steel, paper, electrical material, automobile bodies and frames, lumber, stone, pipe, etc., at amazingly low costs, and with the high-lift feature are making better use of building space.

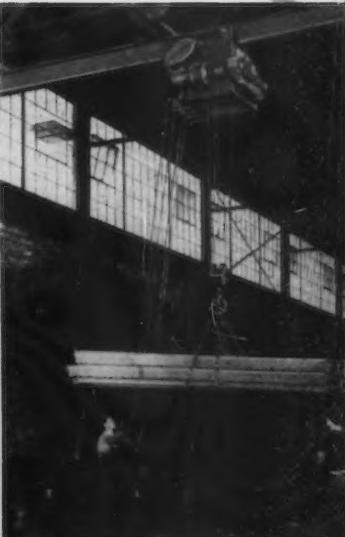
The Hi-Lift line is comprehensive —there is an economical unit to meet YOUR needs.

Northern HI-LIFT HOISTS

serve manufacturing, storage and shipping operations at less cost



NORTHERN ENGINEERING WORKS
2607 Atwater Street
Detroit, Michigan



Typical installations of Northern Hi-Lift Hoists in Various Industries

Dear Editor:

P. R. P.

Sir:

Information reaches us to the effect that you have on the press a twelve-page booklet entitled, "How To Operate Under the Production Requirements Plan." The subject matter appears very interesting to us and we would be very grateful if you could arrange to dispatch to us by air mail special delivery several copies of the pamphlet as soon as it becomes available—with expense bill submitted to the writer.

F. H. LOOMIS,
Republic Steel Corp.,
Cleveland.

AIRCRAFT MANUFACTURE

Sir:

The firm already subscribes to THE IRON AGE; however, we would be very grateful if you would be kind enough to send us a copy of your reports which are entitled "Stretch-Forming Contoured Sheet Metal Aircraft Parts," "Drawing Dies for Airframe Stamping," "Forming Convex Flanges and Joggles," "Hydro-Press Forming with Rubber Platens." We would like to circulate this information among our foremen.

E. F. DROLLINGER,
General Supt.,
Curtiss-Wright Corp.

* These articles are being reprinted as a 24-page booklet.—Ed.

HISTORY REPEATS

Sir:

May we please have two or three reprints of the full text of your editorial, "History Repeats." We think this article extremely clever.

GEORGE F. FARLEY,
Production Coordinator,
Milwaukee Metal Spinning Co.,
Milwaukee.

SAE AND AISI STEELS

Sir:

Will you please send me two reprints of "Correlated SAE and AISI Revised Standard Steels," which appears in the April 9 issue.

O. B. SCHULTZ,
Engineer of Tests,
Lima Locomotive Works, Inc.,
Lima, Ohio.

HELPFUL GUIDE

Sir:

Because of the completeness and all-around usefulness of your Priorities Guide to our division and other divisions in our company, as well as in our numerous plants, would you oblige us by sending us ten more copies of this Guide?

Of the numerous priorities guides that come into our division, yours is the most helpful.

T. F. LARGEY,
Priorities Division,
RCA Manufacturing Co., Inc.,
Camden, N. J.

Sir:

We have found the sixth edition of your Priorities Guide to be of great assistance and shall appreciate it if you will forward six additional copies for use by the Analysts in my office.

MARTIN J. LIDE,
Priorities District Manager,
War Production Board,
Birmingham, Ala.

Sir:

We recently experienced a severe flood in our area which damaged a considerable part of our office records and equipment. Among this material was our priorities information. Would you kindly send us a complete priorities guide with revisions at your earliest convenience?

W. A. SPENCER, JR.,
Clover Leaf Manufacturing Co.,
Honesdale, Pa.

MONEL DRUM

Sir:

We have a monel metal hexagon-shaped drum we should like to dispose of. It is 34½ in. long and 24 in. in diameter with circular rims for rolling. Perforations are ¼-in. holes on ½-in. centers. Drum and cover weigh 275 lb.

M. H. BEST,
Best & Co.,
Alameda, Cal.

FOOD IN CANS

Sir:

Would you be kind enough to send us a half-dozen reprints of your article, "Food in Cans," which appeared in the issue of April 30.

I wish to commend the lucid and interesting presentation of the electrolytic tin plating method which the article contains. We have found it highly informative and helpful.

MILLER MCCLINTOCK,
Can Manufacturers Institute,
New York City.

Sir:

You have published a pamphlet entitled, "Directory of Tool Steels," and also a chart of comparable tool steel grades.

I wonder if you would be kind enough to send me a copy of these, as they would be valuable to me in work here at the field.

MILTON J. GILMAN,
Air Service Command,
Chanute Field.

WOOD CONSTRUCTION

Sir:

In the June 4 issue you have an article on a new building for the Chrysler Corp., which, among other things, will carry the following items in which we are interested:

1. New type of overhead arch rib.
2. New "Victory Sash" made of wood.

3. New type of wooden picket fence which cannot be sealed.

Will you please advise us where we may procure information on these items?

J. T. MOORE,
Fireproof Products Co.,
Charleston, W. Va.

* Further information undoubtedly can be obtained directly from Chrysler Corp. itself or from Albert Kahn Associated Architects & Engineers, Inc., New Center Building, Detroit. One of the Kahn engineers was the inventor of the "Victory Sash" and we believe that the wood picket fence was also designed in the Kahn offices.—Ed.

HIGH SPEED TIPS

Sir:

In the April 16 issue, there was printed an article entitled, "High Speed Tips, Cemented to Low Alloy Shanks," by George Shuler.

We are interested in obtaining five hundred of these reprints to be distributed to the interested contractors in the Detroit Ordnance District.

Will you kindly tell us where these reprints can be obtained and the price for five hundred of them?

WAYNE L. COCKRELL,
Major Ord. Dept. Asst.,
Detroit Ordnance District,
Detroit.

* Feature articles in THE IRON AGE are normally held in type for one month. But when articles are no longer in type they can be economically reprinted by the offset process, which is a form of lithographing. In this instance, 500 copies of the article can be furnished for \$11.50.—Ed.

SCRAP QUALITY

Sir:

As a subscriber to your weekly publication, may I be advised how to determine whether steel scrap is of No. 1 Melting Grade or No. 2 Melting Grade.

Our scrap steel consists of: chrome vanadium steel springs, nickel alloy steel parts, carbon steel parts, malleable iron castings, steel castings and steel plate.

C. A. WITTCKE,
Purchasing Agent,
New York City Omnibus Corp.,
New York

* At least several classes carry a much higher price than either No. 1 or No. 2 steel. You should certainly be able to sell your chrome vanadium steel springs at a premium price, and also a premium should go to the nickel alloy steel parts. Your carbon steel parts, steel castings and steel plate can be grouped together and probably bring the No. 1 heavy melting steel price. The malleable iron castings should be sold separately.

Of course, you may not have enough of each grade to warrant segregating it, in which case you may wish to continue selling it in bulk. Our opinion would be that the bulk price should be the No. 1 level rather than the No. 2 level.—Ed.



AT MONARCH
we work
under these flags
for VICTORY

ON GUARD OVER INSPECTION STANDS THE *Phantom Gear*

Today, more than ever before, Monarch inspectors realize the imperative necessity of positive proof that each Monarch lathe is right before it leaves our plant. They know that on each lathe's performance depends delivery of vital fighting material.

So night and day, through three shifts, "The Phantom Gear" stands guard over each inspection process. This spirit, which for years has inspired Monarch men to do their jobs better, has enlisted in our armed forces. It now stimulates our constantly increasing rate of production, and it sees to it that every Monarch

lathe stands up to its job of helping to build and maintain planes and ships and tanks and guns.

* * *

Monarch lathes today are of the same high quality in accuracy and performance that established our leadership in lathe building. They meet without faltering the continuous operation that is being demanded of them, without time out for maintenance and repairs. They'll be ready, when this war is won, to return to peacetime duties, to help produce more goods for more people, at lower cost.

THE MONARCH MACHINE TOOL COMPANY . . . SIDNEY • OHIO

MONARCH



LATHES

COVER THE TURNING FIELD

How we are building more lathes

More men and machines, and a high spirit of co-operation from every man, have enabled Monarch to increase production greatly during the past two years.

Equally important are production short cuts, and a detailed study of every part of every lathe design to see where standardization could increase output without sacrificing quality. This analysis showed minor changes that give us more production on a fewer number of parts, and enable us to tool up to run these larger quantities.

With these forward steps, and with other measures of simplification of our line, but without loss of utility or scope of turning, we have set our sights on a new "high" for 1942.

This Industrial Week . . .

• • •

AS the nation's industrial war machine reaches the later stages of development, emphasis is bound to be placed on the flow of materials to the new and converted plants. Wartime controls over industrial output are already being altered so as to suggest that the limiting factor on the volume of war goods to be turned out in the U. S. over the next six months will be materials. As the raw material supply grows more critical, more importance must be placed on timing.

This week saw an increase in reports about bad timing, about an unbalanced production of war equipment parts and an uneven distribution of materials. These complaints, made by realists seeking to help war production, frequently concern cases where lack of one part holds up an entire plant. Forced slowdowns and layoffs are sometimes a result.

Freight Cars Not Tied Up

Such situations are sometimes unavoidable because of design problems or other factors but many must be attributed to bad ordering practice and a lack of skillful timing on the flow of material.

Overseas freight accumulation at United States ports is not interfering with domestic freight movement and is not tying up freight cars, according to Joseph B. Eastman, director of the Office of Defense Transportation. Industry noted Mr. Eastman's comment that "from the beginning, it has been known that it would be necessary to store in this country great quantities of war products, for longer or shorter periods, not only to maintain adequate reserves but

until deficiencies in overseas shipping could be overcome.

To relieve congestion of freight cargoes at United States ports, an ODT order authorizes its division of transport to require any railroad serving a port to move to any specified destination, "any export, coastwise or intercoastal shipment of freight which it may have in its possession in such port," notwithstanding previous orders or instructions. This order makes it possible to relieve certain ports of cargoes on hand or in storage which possibly were destined for foreign ports at about the time of enemy occupation of those ports.

To help win the battle of transportation, large capacity storage

See page 121B of this issue of THE IRON AGE for information about a booklet on "How to Operate Under PRP."

depots are being built by the Army; much ground space has been made available by the railroads and the storage and warehousing industry has been efficiently organized.

Since most manufacturers and producers in the United States are now required to operate under the Production Requirements Plan (starting July 1) a last minute rush to understand its workings is now under way in most sections of the metal-working industry.

Manufacturers submitting PRP applications before the July 1 deadline were being assured that they will be notified within a reasonable time of the quantities of metal they will be authorized to receive during the third quarter and the ratings which they may apply to their orders. More than 3000 third

quarter PRP applications were received last week by the WPB division of industrial operations in addition to 8000 received previously.

Interim Procedure Is Set Up

In cases where the approved PRP certificates were not returnable to the applicant by July 1, an interim procedure has been set up under the terms of Priorities Regulations No. 11 so that companies which have properly filed a PRP application may continue to use or extend ratings previously assigned to them until they receive their certificates. However, such companies may not receive more than 40 per cent of their estimated requirements of any material for the whole of the third quarter, and any materials so received must be deducted from the amount authorized on their third quarter certificate.

Since the application of PRP is mandatory, industrial people studying its provisions have learned that the amounts and quantities of materials authorized under PRP for the third quarter, and the level of ratings for industries and individual companies, are being determined in accordance with broad policies established by the WPB requirements committee, assisted by the Army and Navy Munitions Board and the various industry branches. They have also learned that the ratings assigned to any particular company, and the quantity of materials which will be authorized, are dependent in part upon the volume and type of war orders on which the company is

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)

	Pitts- burgh	Chi- cago	Youngs- town	Phila- delphia	Cleve- land	Buf- falo	Wheel- ing	De- troit	S.Ohio River	West	St. Louis	East	Aggre- gate
Week of June 25 . . .	99.0	103.0	99.0	92.0	96.0	107.0	87.0	98.0	103.0	109.0	102.0	108.0	92.0
Week of July 2 . . .	98.0	103.2	98.0	92.0	97.5	104.5	86.0	98.0	102.0	103.0	102.0	108.0	93.0
* Revised													

THIS INDUSTRIAL WEEK

working, and also upon the importance of the company's products in the war economy, regardless of previously issued preference ratings.

New ratings which call for reclassification of backlog, have now been established for war orders, with such new classifications as AAA, AA-1, AA-2 and so on taking precedence over the A-1-A ratings. The rating plan was established to permit greater flexibility in assignment of preference ratings to definite quantities of military and related non-military items, most of which have recently been AA orders or high in the A-1 series. WPB officials believe that the new top ratings now may be used for a balanced program of urgent war materials without seriously disturbing the pattern of ratings for

other war and essential civilian orders.

For another week the pressure for lend-lease material has given

(See page 121-A for detailed explanation of new ratings or war orders. Turn to page 121-A for other information about priorities. Information about prices in the metalworking industry begins on page 115-A.)

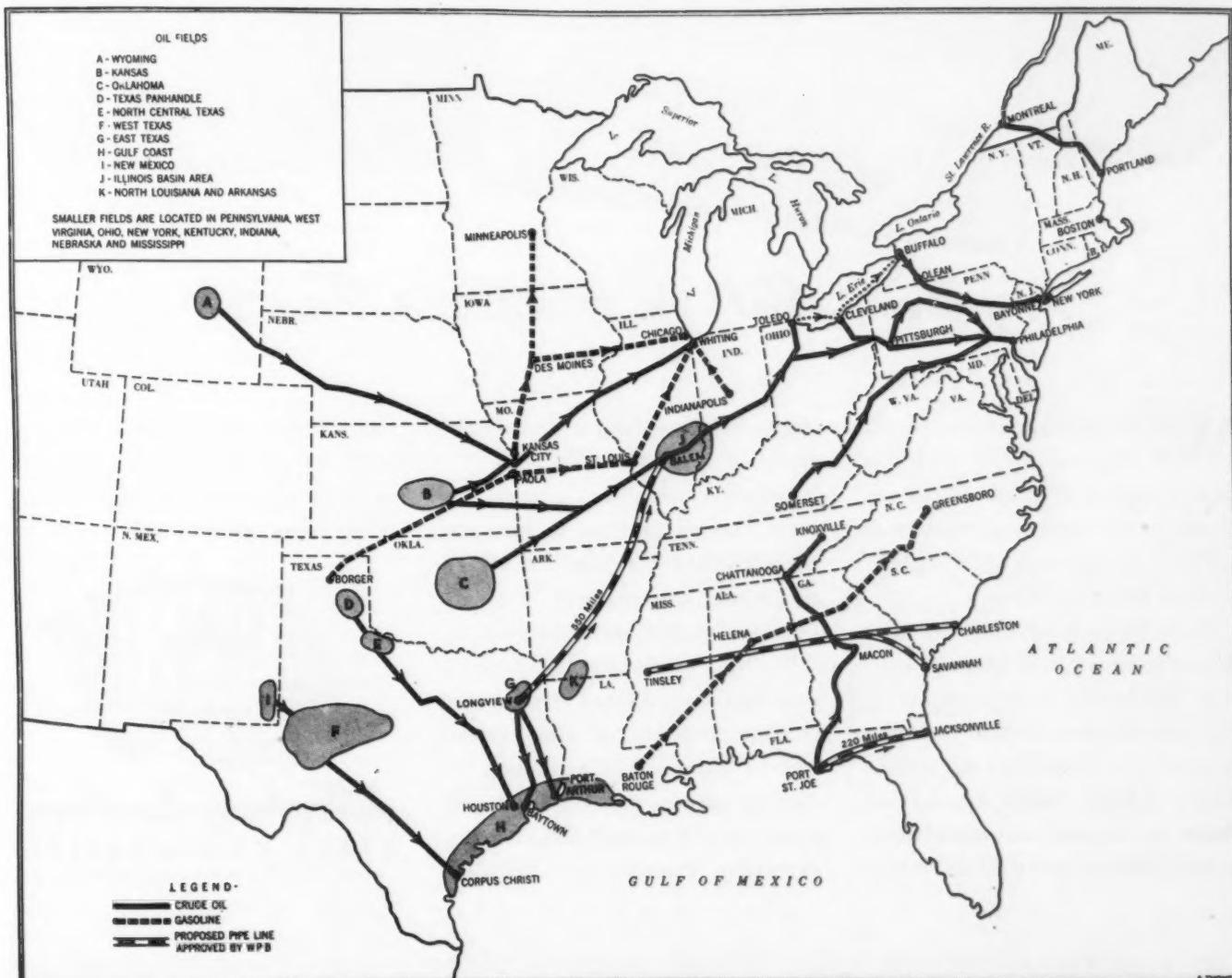
industry, particularly steel makers, a clearer understanding of the vastness of the material requirements of this war.

Steel production this week is down a point to 98 per cent, the depressing factor being scrap shortages rather than the Fourth of July holiday on which there will be little if any slowing up. One plant in the Chicago area has been forced to keep two furnaces down because of scrap shortages with op-

erations in that area continuing at 103 per cent. Youngstown mill operations, hampered by recurring scrap shortages, report a one point drop to 98 per cent, while the Pittsburgh district is down a point to 98 per cent. Other areas reporting lower operations are Buffalo, 2.5 points to 104.5 per cent; Wheeling, down a point to 86 per cent; Detroit, a point lower at 102 per cent, and Southern Ohio River, off six points to 103 per cent.

Cleveland operations are up 1.5 points to 97.5 per cent from a revised rate of 96 per cent while schedules in the Eastern Area are up a point to 93 per cent. Unchanged operations are reported by Philadelphia at 92 per cent, Southern at 98 per cent, Western at 102 per cent and St. Louis at 108 per cent.

GAS FOR THE CARS OF AMERICA: Shown here are the principal gasoline and oil pipelines radiating from the main fields east of the Rockies. There are many smaller lines not shown. The black and white lines indicate the new proposed lines. They are the new 550-mile line from Longview, Tex., to Salem, Ill.; the 200-mile line across Florida from Port St. Joe to Jacksonville; and the one from Tinsley, Miss., to the Savannah-Charleston area on the Atlantic coast.





OEM Photo by Palmer, in an Allegheny Ludlum plant

... But Not to Hitler's Taste

WAR'S emphasis is on *strength*, in men and in steel. That trite little truism is all pictured for you above, where the last admixture of alloys is going into an Allegheny Ludlum electric furnace.

In the shortest possible time after the arc is struck, that batch of alloy steel will be war material in use. It may be stainless bomb racks or ammunition chutes; tool steels fashioning a tank; valves or nitrided shafts in engines; electrical steels in gun and engine controls. What-

ever it is, Hitler definitely won't like the taste of it. Nor will Tojo.

But let's make sure it takes the least amount of time to turn out these finished war goods. And let's not waste, unnecessarily, a single pound of vital alloys in the process.

To help engineers and production men toward more efficient fabrication and use of alloy steels, and to aid in the instruction of training classes, we have developed a wide list of printed aids. They're especially valuable for assisting

"conversion" plants to avoid pitfalls and get under way. Just tell us your alloy steel problems, and let us help you find the answers.



Allegheny Ludlum
STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA

News of Industry

• • •

Nelson Outlines Effect of Metal Shortages on War

Washington

• • • In his presentation of a progress report last Thursday before the Senate Special Committee to Investigate the National Defense, WPB Chairman Donald M. Nelson cast a few shadows in an otherwise cheerful picture. Mr. Nelson told the Committee that the United Nations are producing more war material than the Axis powers but that the latter have piled up reserves that yet are to be overcome.

While pointing out the remarkable expansion in output of steel and other metals he said that there is a shortage of raw materials and that one hindrance to further increase in steel output is the lack of scrap.

Basic steel capacity, he said, has been increased approximately 5,000,000 tons a year and 7,000,000 tons of WPB's projected 10,000,000-ton increase will probably be completed. The importance of getting all the scrap iron and steel possible to feed back into the furnace, he pointed out, cannot be over-emphasized.

"We could be producing more of some of the critical types of steel today if we had more metal to do it with," the WPB Chairman stated. "New blast furnaces are beginning to come in and we are beginning to feel some easing as a result of the stoppage of steel-consuming civilian industries."

To indicate the shortage of scrap Mr. Nelson said that a section of WPB's salvage group has been working on special projects for bringing into the scrap mar-



ARMY SPECIALISTS: H. P. Seidemann, director of the bureau of general administration, left, Charles S. Cheston, director of the bureau of commerce and business personnel, standing, Dwight F. Davis, director-general, Army specialists corps, and William O. Hotchkiss, director of the bureau of Engineering and technical personnel, form the new Army Specialists Corps which is set up to acquire technically trained men for the service.

ket so-called dormant scrap. He indicated the possibility of following the European pattern of gathering metal fences, statuary and other decorative metal work.

With respect to aluminum Mr. Nelson said that a system of scrap collection has been built up and actively stimulated so that this year alone it is expected to return to the system about 370,000,000 lb. of metal and for next year, 650,000,000 lb. It was stated, that it is expected to have about 2,500,000,000 lb. of primary aluminum available for 1943, together with 60,000,000 lb. of aluminum scrap. Facilities are being built, the Truman Committee was told, to fabricate all of this primary metal and the scrap as well.

Copper was said to present one of the most difficult problems. WPB has taken a series of steps to increase domestic production, it was declared, including the payment of over-ceiling prices for high cost copper and setting up of a premium price plan which provides a monthly regard for producers who exceed quotas. Also, it was said, government financing has been provided for the opening of a number of mines and for expansion of existing properties.

The fact remains, it was added,

that 270 odd small mines produce 1½ per cent of domestic copper and the remaining 98½ per cent comes from 15 mines. The job of getting more domestic copper production therefore boils down to getting more output from these 15 mines, Mr. Nelson said. Efforts also are being made, it was explained, to step up zinc and lead production.

In expanding his views on steel, Mr. Nelson said that one particularly acute problem has been the production of plates. Continuing, Mr. Nelson said:

"On Jan. 1, 1942, steel plate producers had a backlog of unfilled orders amounting to 4,586,149 tons, or more than three-fourths of the entire 1941 production, which amounted to approximately 6,000,000 tons. The shortage of plates has become so severe that it was threatening substantially to delay both the Navy and Maritime shipbuilding programs, certain vital construction programs such as those for steel, aluminum, synthetic rubber and 100-octane, and various other programs essential to the war effort. Because of this situation, steel plate was put under complete allocation on Dec. 1, 1941. From January up to the present time a great concentration

NEWS OF INDUSTRY

of effort has been directed toward increasing plate production from existing facilities. This has been done because it offered the quickest and only means of relieving the situation, due to the fact that new plant capacity, no matter how forcefully expedited, could not come into operation until late 1943 or early 1944.

"The shipments of steel plate during the last six months have been as follows:

	Universal			Total
	Sheared	Sal	Strip	(in thousands of short tons)
December, 1941	358	113	183	654
January, 1942	382	122	250	754
February, 1942	379	119	261	759
March, 1942	449	123	306	878
April, 1942	437	122	337	896
May, 1942	461	126	425	1012

"It is estimated that production in June will be slightly larger than in May. In July we hope to be able to produce approximately 1,100,000 tons. The greater part of the increased production has been due to the conversion of the strip mills, which were formerly engaged principally in producing strip for the automobile and other industries. In addition to what was available through simple conversion of these strip mills, we are taking various additional steps by installing certain new facilities in the strip mills of eight producers. These are in the nature of levelers, shears, cranes, etc., and will have the effect of increasing the production of the strip mills by 155,000 tons monthly by the latter part of this year. All told, we expect that we will have increased plate capacity to a total of approximately 1,250,000 tons per month by December.

"I think the committee will also be interested in knowing just what has been happening to the steel plate we have produced. The following figures will show that the proportion going to the Army, Navy and Maritime Commission has risen from 49 per cent of total production in December to 69 per cent in May."

Discussing the substitution of



SCRAP DRIVE: Estimating that its scrap drive will net 1800 tons of metal, sufficient to produce 60 M-3 tanks, Baldwin Locomotive Works is dismantling old and obsolete equipment. These tools, having served as critical machinery in World War I, are ready to do their second bit as scrap to help win World War II.

wood for steel in the construction of small ships, tugs and barges, Mr. Nelson said:

"The Navy now has an authorized program for which contracts have been, or will shortly be, awarded for the construction of many small vessels. These include net tenders, harbor and rescue tugs, lighters (open and covered), diving tenders and other similar craft. If built of steel, the total steel required would be 55,110 gross tons. However, these craft are now designed to use a minimum of steel, the estimated requirements being 16,589 tons, or a saving in steel of 38,521 gross tons. I am further advised that all new construction in these categories will hereafter be of wood.

"The Army procurement program for fiscal 1943 also includes the construction of many small vessels. As planned, these craft will require 5200 tons of steel as against 19,540 tons if they were made of steel, a saving of 14,340 gross tons. I am further advised

that every effort is being and will be made to keep down the use of steel and to substitute wood wherever possible.

"The 1942 procurement program included small craft which required 2340 gross tons of steel. If these had been of steel construction, 9765 tons would have been required. Therefore, a saving of 7425 tons of steel has been effected in this construction.

"The Maritime Commission has under contract, outstanding invitations to bid, or under negotiation, a program for the construction of more than 400 ships, tugs and barges (exclusive of their 'long-range' and EC-2 ship construction programs). These are all larger type, ocean-going craft including small coasters, small tankers, tugs (wood and steel), tanker barges, and dry cargo barges.

"It is estimated that approximately 160,000 gross tons of steel are saved by the wood ship construction program of the Maritime Commission. Further savings are also realized by use of concrete.

"I am further advised that every effort is being made by the Maritime Commission to substitute non-critical materials for steel wherever possible in these categories of vessels.

"The Coast Guard is now building or has just completed more than 800 small vessels—fireboats,

ACTUAL SHIPMENTS OF STEEL PLATE

(in thousands of short tons)

	Dec. 1941	Jan. 1942	Feb. 1942	Mar. 1942	Apr. 1942	May 1942	June 1942	July 1942 (Estimated)
Army and Navy	164	190	212	265	289	385	451	455
Maritime Commission	155	172	208	266	282	309	349	370
Defense Plants, Ship Repairs, Lend-Lease, and Other Indirect Military & Essential Civilian.	335	392	339	347	325	318	273	275
TOTAL	654	754	759	878	896	1012	1073	1100

NEWS OF INDUSTRY

cabin picket boats, patrol and harbor craft, and cutters. These are all of wood-hull construction.

"I am advised that every category that can be made of wood and operate satisfactorily for the duration is being so made. This program covers the remainder of 1942 and fiscal 1943 as now planned.

"The OCIAA, at the request of the Board of Economic Warfare, is undertaking to acquire existing small vessels and to build up to 100 auxiliary sailing schooners in the other American Republics, within the next 12 months. All the vessels will be made entirely of wood, except for such straps, bolts, rods, etc., as may be required. As far as possible all wood and metal requirements are to be supplied in Latin American countries, and only the lacking materials obtained from the United States.

"If all the vessels in the small ship, tug and barge categories in the various programs referred to above had been made of the customary construction, the following additional quantities of steel would have been required:

000,000 lb. primary; in 1940, 419,000,000 lb.; in 1941, 618,000,000 lb. and which this year is estimated to yield in primary aluminum both domestic (1,075,473,000) and imported (242,098,000), 1,318,000,000 lb., 369,000,000 lb. of secondary metal.

"As this Committee knows from its studies and reports on aluminum, one of the major problems has been to obtain enough electricity to convert alumina into aluminum metal. As a matter of fact, the popular method of talking about the aluminum problem has been to discuss it as if it were a problem of producing aluminum ingot. Actually the construction of the facilities to fabricate the metal after it has been produced costs about twice as much in money and critical materials as the construction of the plants to produce it.

"Aluminum forgings in particular are difficult to make, and the machinery necessary is not quickly manufactured. Large sheet and extrusion plants create similar problems. Certain aluminum cast-

problem is recognized and that the combined efforts of many people will lead to continued progress."

Concerning copper and other non-ferrous metals, Mr. Nelson said in part:

"I have placed much emphasis on the need for eliminating copper from military and essential civilian goods specifications wherever that can be done without seriously impairing functional efficiency of the finished products. Likewise, the WPB has been striving to maintain rigid controls over the flow, uses, and inventories of copper throughout the entire economy. Specifically, we have been working on the problem of minimizing the need for copper and brass in shell cases.

"In addition to the use of other being made of our governmental stock of silver. I hope and expect that it will be possible to increase the conservation of copper through additional uses of silver, but at best reliance on silver can provide only partial relief. From here on, non-essential civilian users cannot expect to obtain any copper, and only a necessary minimum amount will be available for essential non-military needs.

"In making our plans, we are counting upon very substantial scrap recoveries. Additional scrap recoveries which are very desirable will go into essential military and civilian production."

	Additional Steel
Navy Program	38,521 gross tons
Army Program	21,765 gross tons
Maritime Commission Program	160,000 gross tons indeterminate
For wooden ships only approximately	
For concrete ships only approximately	
Coast Guard Program	8,320 gross tons
For patrol boats, harbor craft and cutters	
Latin-American Program	(10,000) gross tons
For sailing vessels (estimated)	
TOTAL ADDITIONAL TONS REQUIRED (or Tons of Steel Saved)	238,606 gross tons

"A problem lies in the continued use of steel for certain non-governmental construction programs for small boats and ships. Steps under consideration for substituting wood wherever possible in such construction should result in conserving perhaps 40,000 tons of steel."

New production of aluminum from all Government programs, Mr. Nelson said, is beginning to come in at a very rapid rate and it is expected that each month, including June, large additions will be realized. For example, in June, it was stated, total additional capacity of 150,000,000 lb. a year came in and the same amount has been set for July and 118,000,000 lb. for August, etc. Continuing, Mr. Nelson said:

"This is all in contrast to a system which produced in 1939, 327,-

ings have presented serious problems of limited fabricating capacity. We are concentrating a great deal of attention on the problems involved in increasing fabricating capacity and in precise scheduling of operations to make more effective use of the capacity we have. Fabricating capacity is being increased, but it takes time.

"Increasing production has been matched by a program of limiting the uses of aluminum throughout the Armed Services. Civilian production long since lost all claim to aluminum except for limited quantities in very special cases.

"Redesigning military items to eliminate scarce materials must, you will recognize, be a continuing process. I do not believe there will come any time before the end of the war when we can say, 'That job is done.' I do believe that the

Eastern Penna. Furnace To Resume Production

Philadelphia

• • • A blast furnace idle for 12 years is expected to be in production within a week or ten days in this area. The stack is slated to turn out a daily average of 350 tons of basic pig iron for the first few months, after which plans call for a switch to ferromanganese. Output of the latter will probably be between 100 and 125 tons.

Funds for the venture were supplied by the Defense Plant Corp. The furnace will be operated by the Pittsburgh Ferromanganese Co., a subsidiary of the Pittsburgh Coke & Iron Co. Lake ores will be substituted for the imported ores formerly consumed, and it is understood that allocations of iron from the furnace have been made as of July 15.

An extra



carbon for Bryant

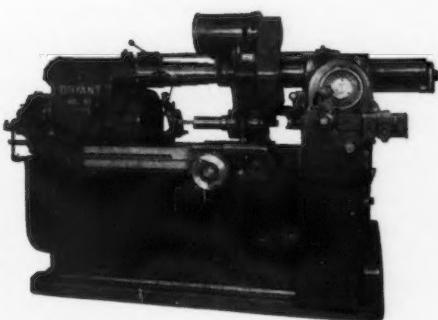


On memorandums — notes — specifications that cover jobs demanding internal grinding, it is easy to issue standing instructions to make "an extra carbon copy for Bryant."

Right from the earliest stages of development on internal grinding work, Bryant engineers can use this information to study new ways to combine operations, cut costs and save time for you.

Whether your problem is one of urgent, immediate war production or far-sighted planning for post-war profits, Bryant engineers are ready to cooperate with your own staff. Bryant productive capacity, already tripled, is constantly increasing. Bryant engineering service is setting the pace on internal grinding today.

The more information you place in the hands of Bryant engineers, the more they can help to push costs down and profits up on internal grinding work for you. Make "an extra carbon for Bryant."



BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U. S. A.



Today every ton of IngAclad Stainless-Clad Steel that is rolled is a two-way contribution to Victory.

First—By providing perfect stainless service, it speeds up production in the Chemical, Food, Textile, Dairy and other essential Industries.

Second—By greatly reducing the quantity of vital alloys required to give stainless service, it releases more of these precious metals for other direct war uses.

So today, IngAclad is a promise of Victory. Tomorrow, when Peace

comes, it will again offer you the promise of those many economies which its pre-war use had already demonstrated to American Industries.

IngAclad is rolled in Sheets 8 to 18 gauge; and in Plates 3/16" and heavier. Regularly supplied clad with 18-8 stainless, but also available in other analyses.

We also produce solid corrosion and heat-resisting alloys.

INGERSOLL STEEL & DISC DIVISION BORG-WARNER CORPORATION

310 South Michigan Avenue • Chicago, Illinois
Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

"*A Borg Warner Product*"

INGACLAD
STAINLESS-CLAD STEEL

Checkoff Cards Ruled As Sufficient Evidence

Washington

• • • Checkoff cards signed by employees of the Lebanon Steel Foundry are sufficient evidence of the SWOC (now United Steelworkers of America) as their collective bargaining agency, it was held on Monday by the Court of Appeals, District of Columbia. Dissenting, Associate Justice Harold M. Stephens said that he thinks that "it is sufficiently clear that the checkoff cards say nothing expressly on the subject of authority for collective bargaining, and I am unable to conclude that they imply anything on the subject."

This view of Justice Stephens upheld the contention of the company. The company maintained that the checkoff cards did not specify that the union should be the bargaining agent and contended that the National Labor Relations Board should not have taken into consideration custom and usage in the locality to supply such intent.

Deduction of union dues from members wages was authorized by the checkoff cards.

Tube Mill Workers at Lorain Stage Outlaw Walkout

Cleveland

• • • Around 3000 workers at the Lorain, Ohio, plant of National Tube Co. staged a "wildcat" strike last week when butt mill employees demanded reclassification of job and wage rates. After 2½ days the strike ended following a civic celebration on the completion of a large reconstructed blast furnace.

District CIO officials termed the strike an outlaw affair, but urged the company to meet with the men in an effort to reach a settlement.

Meanwhile, slowdowns at the plant of Aluminum Co. of America in Cleveland continued, and trouble broke out at other plants. Mayor Frank Lausche was perfecting plans for a new mediation council which he hoped would go far toward solving this city's strike problems.

Clears Up Flood Damage

• • • All departments of the Bethlehem Steel Corp. plant which was struck by a flash flood late in May are now back in operation.

INDUSTRY

"Little Steel" Can Pay \$1 Increase WLB Panel Claims

Washington

• • • The WLB's fact-finding panel reported that "Little Steel" is able to pay a wage increase demanded by the USWA union. The panel's report is not a recommendation, and public hearings conducted by the board will be completed before the board will make any decision. There was no indication this week whether the board would rule for or against the wage increase. This is the first of several wage increase demands before the Board, others being by the United Automobile Workers for increases from General Motors and Ford.

A new basis for deciding whether a wage increase is justified is developed in the report of the fact-finding panel of the War Labor Board, in the opinion of Inland Steel Co. Union demands on Inland and three other steel companies, referred to as "Little Steel" involve the questions of a flat \$1 a day wage increase and the closed shop and check-off.

The panel split two to one on the findings relating to union security, the majority holding that union security in the form of a maintenance of membership clause together with the check-off is constructive and would make for better plant relations. The majority stated that the check-off if adopted generally would involve large sums of money not publicly accounted for, while normal dues collection involves a salutary control over union leaders.

New Allis-Chalmers Plant Eschews Metal for Wood Milwaukee

• • • It took just ninety days and a construction technique borrowed from World War I to make ready a new plant for production of Navy material at the Allis-Chalmers Mfg. Co. It was the second big Allis-Chalmers war production unit to begin operating within the month.

Practically a self-contained shop, the wood and brick building covers 200,000 sq. ft. Practically the only metal used was for caps at the ends of timber tresses and columns. The caps were produced in Allis-Chalmers' own foundry.

ROEBLING Wires ROUND... FLAT... SHAPED

A FEW WIRES TYPICAL
OF ROEBLING'S BROAD
SPECIALTY PRODUCTION

SHAPED WIRES

FLAT WIRE
TO SPECIFICATIONS

MUSIC WIRE FOR
PARACHUTE PILOT-CHUTES



The springy frame for the small pilot-chute that pulls the Army parachute from the pack must be right. The

Roebling wire used for this service meets exceptionally high standards for steel analysis, temper and fatigue resistance.

The speed and quality required by war production again prove the wisdom of turning to Roebling for special round, flat or shaped wires. If you have a tough job, avail yourself of Roebling's long experience in the production of high grade wire. Every day we're turning out wire to specifications demanding the finest craftsmanship and close adherence to physical and chemical requirements.

Special facilities to handle this type of work... Man-power to give it the close attention to details it requires... these are Roebling's contribution to your Victory program.



JOHN A. ROEBLING'S SONS COMPANY

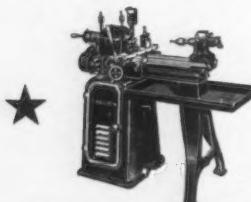
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SHELDON Back Gared Screw Cutting
PRECISION LATHES



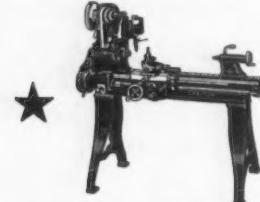
FOR THE TOOL ROOM

The finest 10", 11" and 12" lathes ever built in the moderate price field. Large special analysis steel spindles ground all over, with extra collet capacity. Hand scraped Bronze, Ultra-Precision Ball or Super-Precision Roller spindle bearings (the finest bearings obtainable). Heavy braced, semi-steel beds with hand-scraped ways (2 V-ways and 2 flat ways). These lathes come with a choice of aprons, gear boxes, and drives including the anti-friction, 4-speed, V-belt Lever-operated pedestal base motor drive illustrated. Telescopic Taper Attachment and other accessories available.



FOR PRODUCTION

Sheldon Lathes will stand up to any production work within their capacity—are ideal for second operation work. Production models available with any or all of these features: Ultra-Precision Ball or Super-Precision Roller spindle bearings, Lever-operated Collet Attachment, Lever-operated Tail Stock, Lever-operated cross slide with double tool post, Lever-operated turret, etc.



FOR MACHINE SHOP

Both Bench and Floor models with choice of Semi-quick or Full-quick Change Gears, Plain Aprons or Worm Feed Apron with Power Cross Feed, Overhead, Back or Underneath Motor Drives—Telescopic Taper Attachments, Tool Post Grinders, Milling attachments and all standard accessories.



Also a full line of Arbor Presses and milling machine Drill Press and Shaper Vises.

Write for Catalog and name of nearest distributor.

SHELDON MACHINE CO., INC.
4240 N. Knox Ave. Chicago, U.S.A.

NEWS OF INDUSTRY

62,484,162 Tons of Steel Consumed in 1941

• • • Distribution of a record-breaking quantity of steel into consuming industries during 1941 showed a marked rise in industries that are obviously in war work. However, shipments of steel for war purposes during the year have been consolidated into the various industry classifications for concealment. Consumption during 1941 reached the new high of 62,484,162 tons, as compared to the previous record of 45,850,825 tons set in 1940. This increase in production is more remarkable in the face of an ever increasing shortage of raw materials that has plagued steel producers at every turn.

Jobbers, dealers, and distributors of steel constituted the largest single consumer, requiring 9,199,811 tons or 14.72 per cent of the total steel shipped, but the classification of pressing, forming, and stamping showed the greater percentage of increase in steel consumption, according to the American Iron and Steel Institute. In 1940, 2,159,715 tons of steel, or 4.6 per cent of total consumption, went into pressing, forming, and stamping, while in 1941, 6,321,536 tons or 10.10 per cent went into these channels.

Also showing a sharp rise in steel consumption was the shipbuilding industry, which in 1941 consumed 2,733,413 tons, or 4.37 per cent, of the total steel moving into consuming channels, while in 1940, only 940,124 tons, or 1.9 per cent, of the steel went into shipbuilding.

In 1941, steel converting and processing industries consumed 7.66 per cent of the steel moving into consuming channels, but this was considerably lower in proportion to the total than the 11.3 per cent used in 1940. As to actual steel used, however, the total used in 1941, 4,797,803 tons, topped 1940's 2,928,842 tons substantially. Likewise, while the steel going into construction during 1941 was nearly twice that going into the industry in 1940, when compared to the total steel consumed, 1941 tops 1940 by only 2.2 per cent when considered on the basis of consumption against the total steel consumed by all industries.

During 1941, 13.97 per cent, or 8,731,492 tons of steel, were exported and directed into miscellaneous industries, and compared to 10,234,455 tons, or 21.2 per cent in 1940. This would tend to indicate that less steel was being shipped for Lend-Lease, and that the steel that would ordinarily be

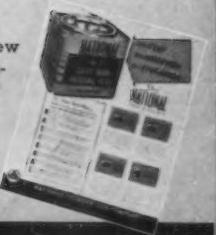
Steel Distribution by Consuming Industries, 1941

	Net Tons, 1941	Per Cent of Total, 1941	Net Tons, 1940	Per Cent, 1940
STEEL CONVERTING AND PROCESSING INDUSTRIES	4,797,803	7.66	2,928,842	11.3
Wire drawers and wire products manufacturers	535,741	0.86	503,694	...
Bolt, nut, and rivet manufacturers	1,160,767	1.86	707,958	...
Forging manufacturers	1,144,442	1.83	574,478	...
All other steel plants and foundries	1,956,853	3.13	1,142,712	...
JOBBERS, DEALERS, AND DISTRIBUTORS	9,199,811	14.72	6,686,534	13.8
Oil and natural gas industry	1,018,371	1.63	653,936	...
All other	8,181,440	13.09	6,032,598	...
CONSTRUCTION INDUSTRY	8,127,889	...	4,967,984	10.2
Public (municipal, state, federal)	518,555	.83	...	...
Highways	708,613	1.13	...	...
Railways	102,494	.16	...	...
Automotive and aircraft	406,463	.65	...	...
Utilities	515,003	.82	...	...
Building trim, accessories, and bidders, hardware	1,020,109	1.63	...	...
All other	4,856,652	7.77	...	...
SHIPBUILDING INDUSTRY	2,733,413	4.37	940,124	1.9
PRESSING, FORMING, AND STAMPING INDUSTRY	6,321,536	...	2,159,715	4.6
Metal furniture and office equipment	676,944	1.08	470,373	...
Hardware and household equipment	1,746,810	2.80	949,855	...
All other	3,897,782	6.24	739,487	...
CONTAINER INDUSTRY	4,489,410	...	2,985,338	6.2
Oil and natural gas industry	437,367	.70	...	...
All other	4,052,043	6.50	...	...
AGRICULTURAL, INCLUDING IMPLEMENT & EQUIPMENT MANUFACTURERS	1,153,678	1.85	919,502	1.9
MACHINERY AND TOOLS	6,392,202	...	1,185,408	3.9
Machinery and tools, excluding electrical equipment	1,569,712	2.51	1,108,463	...
Electrical machinery and equipment	1,301,275	2.08	776,945	...
AUTOMOTIVE AND AIRCRAFT INDUSTRY	6,392,202	10.23	7,233,345	14.9
All railroads	5,680,801	...	3,777,377	7.8
Car and locomotive builders and parts manufacturers	3,533,866	5.66	2,575,181	...
RAILROAD INDUSTRY	2,146,935	3.44	1,202,196	...
Oil and natural gas, including pipe lines	1,985,140	...	1,132,211	2.3
Mining, quarrying, and lumbering	1,735,983	2.78	990,876	...
All other	249,157	.40	141,325	...
MISCELLANEOUS INDUSTRIES AND EXPORT	8,731,492	13.97	10,234,455	21.2
Totals	62,484,162	100.00	45,850,825	100.00



**THREE NEW FLUX FORMULAS GIVE YOU
CORRECT FLUXING ACTION THAT RESULTS
IN SOUND WELDS...DENSE WELDS...and FAST WELDS
EVERY TIME!**

Write today for new
bulletin giving com-
plete details on
these fluxes as
well as National
No. 22 alum-
num flux.



NATIONAL CYLINDER GAS COMPANY

205 W. Wacker Drive

Offices in Principal Cities

Chicago, Illinois

NEWS OF INDUSTRY



KEEP your Machine Tools YOUNG!

Don't let the steady flow of defense work in your plant be tied up by a tardy machine tool. Insure the satisfactory and continuous functioning of your machines by using Ruthman Gusher Coolant Pumps.

They really do a good job—so much so that they are now standard equipment on many well-known machine tools. Therefore specify Ruthman Coolant Pumps—the pumps that keep your cutting tools young.

The
RUTHMAN
Machinery Company
CINCINNATI, OHIO, U.S.A.
1821 Reading Road

Steel converting and processing.....	7.68
Jobbers, dealers, and wholesalers.....	14.72
Construction.....	12.99
Shipbuilding.....	4.37
Pressing, stamping, and forming.....	10.12
Container.....	7.20
Agriculture, including implement and equipment.....	1.85
Machinery and tools.....	4.59
Automotive and aircraft.....	10.23
Railroads.....	9.10
Oil, natural gas, and mining.....	3.18
Export and miscellaneous.....	13.97

LARGEST CONSUMER of steel was the jobber-dealer-wholesaler classification, followed by exports.

pegged for Lend-Lease was being finished into war implements in this country. The finished products rather than the steel itself was moving into the United Nations war chests.

Based on finished steel production during 1941 of 62,484,000 tons, steel ingot production was in the neighborhood of 82,800,000 tons, or 24 per cent above 1940's record output. However, ingot capacity, as of Jan. 1, 1941, was 84,152,000 tons, and as of Dec. 31, 1941, was approximately 88,000,000 tons. Probably one major reason why production was not higher by at least 2,000,000 tons was a deficiency of scrap. On the whole, other raw materials were not lacking, but the Bureau of Industrial Conservation reported that when its activities started there were from 40 to 45 furnaces off for lack of scrap. As of March 2, the official report of the American Iron and Steel Institute indicated that 20 open hearths were down because of scrap shortages. However, on June 15, while scrap in many instances was nip and tuck, there were no steelmaking operations curtailed for lack of it.

During 1941, another difficulty

met by the industry was the shift, which was drastic, from light to heavy steel production, required by the war producing industries and for expansion of steelmaking capacity. A distortion of the conventional product distribution pattern not only caused difficulties in mill arrangements, but also tended to have a dampening effect on the total steel produced.

Stanley Subcontracting Plan To Be Used in Chicago Area

Chicago

• • • J. Overlock, Chicago regional director of WPB, has been given authority to expand the Stanley plan of expediting subcontracting to a permanent basis in this region. It was also reported likely that the plan will be extended to fields other than the metal working industry whenever bottlenecks appear that can be broken by more extensive subcontracting, and that it may be expanded on a nationwide basis.

The Stanley plan was described in detail in THE IRON AGE, page 72, May 14, 1942.

"Committee OF WELCOME"



Official U. S. Signal Corps photo

● We hope no enemy planes will ever fly over an American city. But if they do, here's the sort of reception committee our armed forces have ready to give them a hearty but discouraging welcome.

Our Government isn't telling how many anti-aircraft guns we have today, but there are many thousands. Our national production program for 1942 and next year will add another 55,000.

It takes high-speed production methods to turn out arms on such an unprecedented scale. And since guns, gunmounts, firing instruments and even shell must be painted, it also takes high-speed spray painting equipment to prepare them for service.

That's why DeVilbiss is busy now turning out modern spray systems for arsenals, ordnance plants, shipyards and private factories engaged in war manufacture. For coating every kind of materiel from tiny fuse parts to giant armor steel plates. And for defense camouflage and blackout painting on homes and buildings everywhere.

The speed and dependability which made DeVilbiss the leader in peacetime industrial painting now prevents any danger of a finishing bottleneck in vital all-out war production. If your plant has a war contract, there's a modern DeVilbiss Spray Painting System designed to help you do faster and better finishing.

THE DEVILBISS COMPANY • TOLEDO, OHIO
Canadian Plant: WINDSOR, ONTARIO

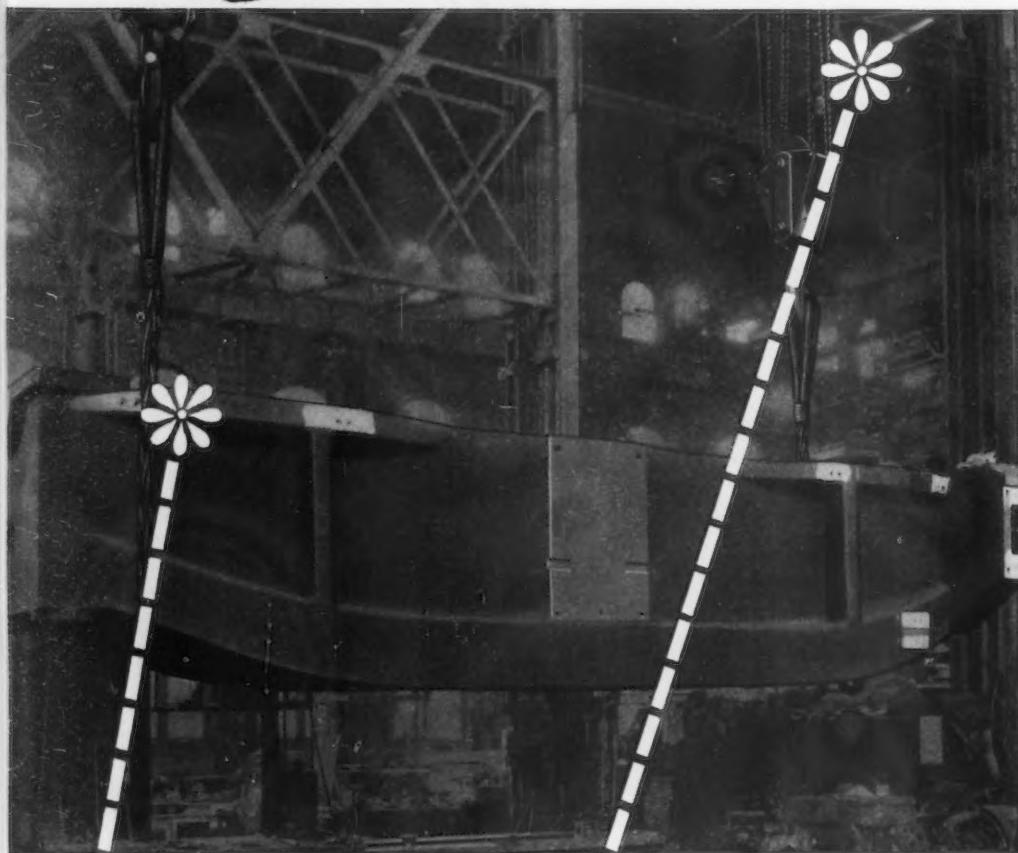
• * •
THE COMPLETE DEVILBISS LINE CONSISTS OF: Spray finishing equipment • Automatic coating machines • Tanks for spray materials Spray booths and exhaust fans for vapor and dust elimination Air regulators, cleaners and dusters • Air compressors • Respirators Specialized hose for paint, air, water, gasoline, welding and pneumatic tools • Hose connections • Water and oil guns • Equipment to prevent offset in printing • Paint strippers • Medicinal atomizers.



DEVILBISS SPRAY SYSTEMS

Delivering the goods ahead of Schedule!

NEWS OF IN



MACWHYTE Atlas Braided Slings

"Keep 'em moving fast, but SAFE!"
That's a pretty tough order, but Macwhyte Atlas Braided Slings are filling it. A look at this Sling's braided construction shows why...



You don't find this braided construction (of both left-&-right lay endless wire ropes) in any other sling. BECAUSE of this special sling body, Macwhyte Atlas Slings have . . .

- ★ Perfect balance that eliminates spinning
- ★ Extreme flexibility, they handle like a silken rope; resist kinking
- ★ No splices to wicker and injure hands
- ★ Positive safety of endless wire ropes.

Pipes, tanks, rolls, guns, engines, sheet steel, machinery . . . the list of materials handled today by Macwhyte Atlas Slings is almost endless. These SAFETY slings can help you step up production. Write on your company letterhead for helpful rigging bulletins.

MACWHYTE CRANE ROPES

You've seen the good news; perhaps you helped make it. Production of many war materials is "ahead of schedule"!

Handling materials faster in plants all over the U. S. A. is the job of Monarch Whyte Strand PREformed Crane Rope. SAFE . . . fatigue-resisting and long-wearing, Monarch PREformed asks no quarter in the battle of production, is a tried and proved soldier.

Prepare today for tomorrow

Macwhyte Company is ready and willing as always to help you get the correct size and construction of rope for your equipment. Our factory is on full schedule day and night.

Write to Macwhyte Company or any of our distributors and specify the following: Make, model, capacity of your crane—size, grade and construction of rope you are now using—preference rating, and approximate date you will be needing the rope.

**CRANE ROPES to hoist the load . . .
BRAIDED SLINGS to harness it safely. BUY BOTH FROM**

MACWHYTE COMPANY

2911 Fourteenth Avenue, Kenosha, Wisconsin — Manufacturers of wire rope to meet every need —
Left- & -Right Lay Braided Slings — Stainless Steel Wire Rope — Monel Metal Wire Rope — Aircraft
Cable, Aircraft Tie-Rods, "Safe-Lock" Swaged Terminals.
New York Pittsburgh Chicago Ft. Worth San Francisco Portland Seattle. Distributors throughout U.S.A.

Tin Ore Separator Lab Tests Favorable

Pittsburgh

• • • An experimental electronic ore separator, developed by the research laboratory of Westinghouse Electric & Mfg. Co. was demonstrated here recently, pulling out the tin from low-grade tin ore taken from a deposit in a southern state. If the separator proves as efficient in actual mining operations as it has in laboratory runs, Westinghouse officials feel that it will be a valuable aid in easing the tin shortage.

The separator, shown in the accompanying photograph, has a foot-wide metal drum, which turns at a surface speed of 12 miles per hr. Finely ground ore is fed into the machine through the top hopper, onto a charged rotating drum. Parallel copper wires, carrying 12,000 volts, are used to set up the electrostatic field. The material was separated electrostatically into two piles, one containing various impurities, as rock, etc., and the other pile consisting of a tin concentrate running about 70 per cent tin.

TIN ORE SEPARATOR: An experimental electronic tin ore separator, developed by Westinghouse Research Laboratories, East Pittsburgh, is shown here separating low-grade tin ore taken from a deposit in a southern state.



INDUSTRY

Inland Mill Rolls 3515

Tons of Plates in Day

Chicago

• • • Another new record in the production of plates for Liberty ships was reported last week by Inland Steel Co. A total of 3515 net tons of ship plate was rolled on the 76-in. continuous hot strip mill and shipped for the Maritime Commission during a single 24-hr run, according to A. P. Miller, assistant general superintendent of Inland's Indiana Harbor plants.

The 3515 net tons during 24 hours was an average of 1172 net tons per 8-hr. turn or 146.4 net tons per hour. The best contribution to the new record came on the 4 p. m. to 12 midnight turn, when 1304 net tons was rolled.

ICC Approves New Light Tank Cars For Gasoline

Washington

• • • The Interstate Commerce Commission last week granted a WPB application to authorize the shipment of gasoline in government-owned tank cars to be constructed of strip-mill sheets instead of the current heavier cross-rolled plates. Specifications for the new tanks provide for $\frac{3}{8}$ -in. bottom sheets and heads, and $\frac{1}{4}$ -in. shell, expansion dome sheets and expansion dome heads.

The tanks will be cylindrical, with single-compartment barrel section constructed of four longitudinal strip-mill steel plates having a maximum width of 72 in.

Huberman In New Post For Antitrust Division

Washington

• • • M. S. Huberman, special assistant to the Attorney General, has been appointed chief of the newly-established War Programs Section of the Antitrust Division. He will represent the Department of Justice in negotiations and consultations with the WPB and other federal war agencies on matters affecting the war program. Acting under Mr. Arnold's supervision, Mr. Huberman is authorized to state informally the views of the Department whenever the WPB or other agencies find it necessary to ascertain the Department's policy in advance of a formal communication.



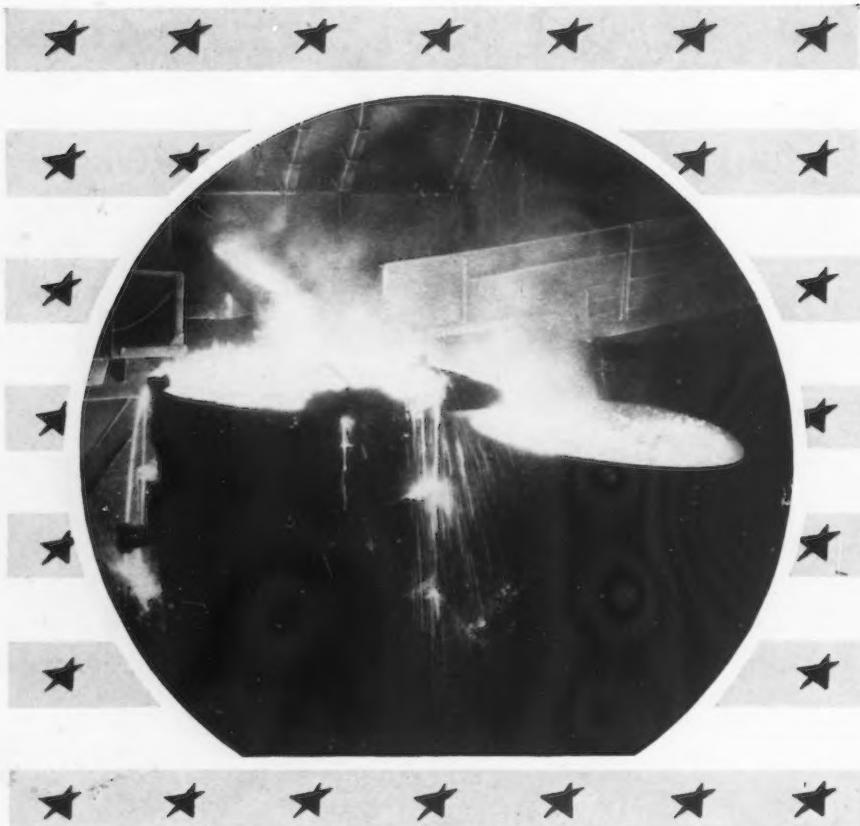
OUT for MORE THREADS

The Collapsible Tap illustrated is a new design of universal type. With the handle you can use it as a stationary tap on turret lathes and hand screw machines. Without the handle it becomes a rotating tap for drill presses or tapping machines.

The non-rotating Self-Opening Die Head uses the same chasers as do the rotating types so that you can produce more threads with a nominal investment in tool equipment.

From every production viewpoint Murchey Threading Tools are out for more threads.

Murchey
MACHINE & TOOL CO.
Detroit, Michigan



Steel-

MASTER OF OFFENSE

Wherever, whenever, however you go — in home, factory, office or recreation — contact with steel is inescapable, for it is basic to all progress in agriculture, commerce and industry.

But we're at war! Commonplace things must be forgotten temporarily for the more important job ahead. And because Steel is Master of Offense, all else must fade into insignificance.

We will win, but it's going to take all the steel we can produce. Here at Andrews we are glad to have a part, and it's a great satisfaction to know that every pound of Andrews Steel is going into the sinews of war or the machines to produce them.

Production has been stepped up tremendously. Yet Andrews maintains the same high quality that has characterized its product since the year the company was founded — 1908.

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.
Basic Open-Hearth Alloy Steel Billets and Slabs

Scrap Shortage Is Fault of OPA, WPB, Philip Murray Says

• • • The responsibility for the failure to accumulate adequate scrap iron and steel stockpiles, according to Philip Murray, president of the United Steelworkers of America, rests with WPB's scrap section, the OPA, and the Bureau of Industrial Conservation. The creation of a three-man War Scrap Action Board as an independent agency of the Government, to take complete jurisdiction of the scrap situation, was proposed. The board would consist of a Presidential appointee, and a representative each for the steel industry and the USWA.

This board would have full power to do whatever necessary to build up a scrap stockpile of at least 10,000,000 tons by Nov. 1, 1942, and to otherwise keep the steel industry operating at 100 per cent of capacity.

Mr. Murray claims that three alarming bottlenecks in the production of steel, each of which could be quickly eliminated, are delaying tank and ship construction, and that the failure to accumulate adequate scrap threatens curtailment of steel mill operations to as low as 80 per cent of capacity this coming winter.

All plants now engaged in heat treating and fabricating homogeneous armor plate, he said, would have to be closed 10 days each month for a year to do as much damage to the tank program as is now being done by the failure of one steel corporation to utilize fully its existing facilities and those of small steel firms through a program of subcontracting.

Plate mills would have to shut down seven days each month for the duration of the war to do as much harm to the shipbuilding program as is now being done by the failure of several steel corporations to go all-out in the conversion of strip mills to steel plates, and to allow full use of existing facilities in small companies.

Furthermore, Mr. Murray charged, the entire steel industry would have to be shut down one month to begin to equal the damage to the whole war production program as will be done this winter unless the current failure to

BIC Chief Denies Murray's Charges

Washington

• • • Counteracting the charges made by Philip Murray, president of the United Steel Workers of America, that the WBP, OPA, and the Bureau of Industrial Conservation were directly responsible for the shortage in scrap faced by the steel industry, Paul C. Cabot, deputy chief of the Bureau of Industrial Conservation, made public a letter sent to Murray. The letter states that the citizens of the country and industry are doing much to aid the program; that many members of the USWA have patriotically aided the government in the matter; and "we only hope that you will make it unanimous."

Cabot stated that the number of open hearths down for lack of scrap have been cut to 20 in March, and on June 15 there were no furnaces down for lack of scrap. Furthermore, May steel operations were 98.2 per cent of capacity, 7,387,000 tons of steel having been melted. Scrap consumption totaled 4,857,000 tons, a quantity that would not have been possible without the direction of the Bureau. Stating that Murray was not familiar with the set-up of the Salvage Branch of the Bureau nor with its results, Mr. Cabot gave a resume of these, outlining the efforts of the Industrial and General Salvage Sections, and the results of various salvage programs.

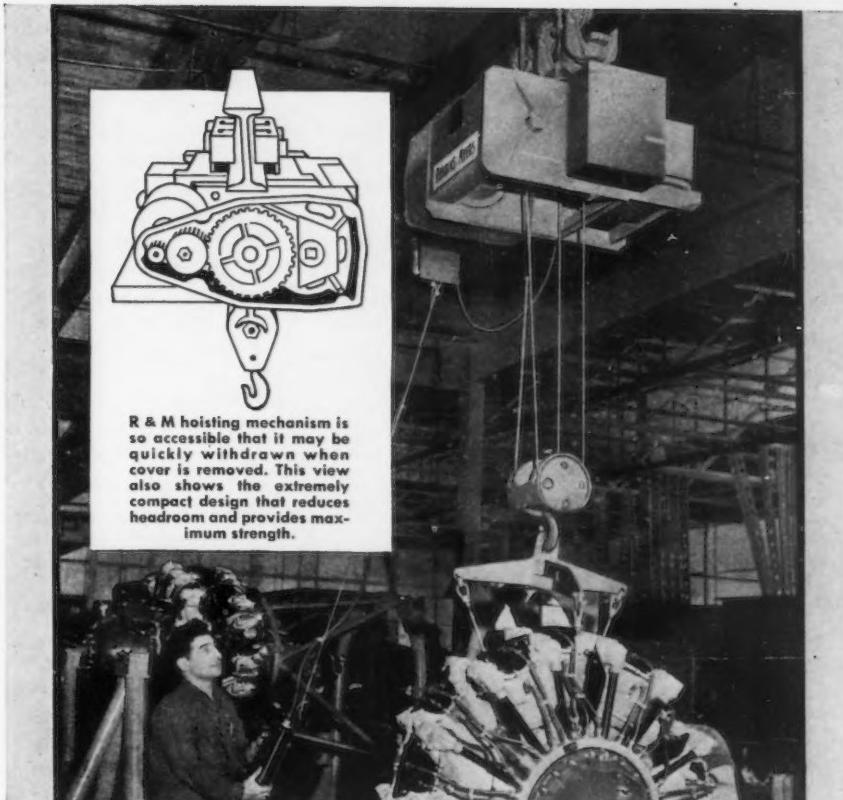
In closing, Mr. Cabot said: "The statement appearing in the newspapers, under date of June 25, attributed to you, in which you are quoted as having said that the government's failure to gather scrap was 'almost criminal' would appear to be unwarranted."

accumulate scrap stockpiles is speedily corrected.

The cure-all for steel bottlenecks, Murray claims, is for the WPB to call a conference of representatives of the small and large steel firms and the USWA to take action on his suggestions. (The USWA leader has frequently proposed such conferences).

Subcontracting should be substituted to speed up armor plate production by at least six months, Mr. Murray pointed out. A subcontracting program is feasible because there are 22 small steel firms available; certain plants of larger producers are not being

14 R & M HOISTS Speed this Firm's War Work!



R & M hoisting mechanism is so accessible that it may be quickly withdrawn when cover is removed. This view also shows the extremely compact design that reduces headroom and provides maximum strength.

In the roaring plant of [redacted], now pouring out sleek "[redacted]" fighters in deadly numbers, R & M All-Steel Hoists—fourteen of them—are helping lift production to new records!

Mounted on an R & M Motor-Driven Trolley, the 3-ton model shown above is "air-expressing" an engine to the next operation. Thirteen other R & M Hoists, strategically spotted in several departments, are similarly speeding [redacted]'s output.

R & M All-Steel Hoists range in capacity from 1,000 to 15,000 lbs. They're precision-built of steel from track to hook, handle loads from any angle with perfect balance. For these reasons—and because of their trouble-free, year 'round performance—they are the choice of production men in countless industries.

Whatever your hoisting problem, "take it up" with R & M! Our expert representatives will help you find the solution. Call the nearest R & M sales and service office, or write us at the factory.

R & M SALES AND SERVICE OFFICES

Albany.....	364 Broadway	Cleveland.....	352 Rockefeller Bldg.	New York.....	200 Varick St.
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Boston.....	55 Long Wharf	Detroit.....	2921 E. Grand Blvd.	San Francisco, 116 New Mfgmry, St.	
Buffalo.....	2005 Delaware Ave.	Houston.....	3715 Harrisburg Blvd.	Seattle.....	216 Walker Bldg.
Chicago.....	2400 W. Madison St.	Jacksonville.....	305 Bisbee Bldg.	Syracuse.....	204 State Tower Bldg.
Cincinnati.....	418 New St.	Newark.....	700 Bergen St.		
				Montreal....	Lyman Tube & Supply Co., Ltd.

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HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

NEWS OF INDUSTRY

Do Not Let Scrap Drive Bog Down!

As a people we are accustomed to all sorts of drives, which have become intensified and more numerous in these war times.

We are apt to work hard for a week or a month—and then let down in our efforts.

Recently it has been rubber scrap that has been claiming major public attention.

But the campaign for iron and steel scrap must not for a moment be lost sight of if we are to supply our Fighting Forces with all the war materiel they need.

A few weeks ago the iron and steel scrap supply situation had become a little easier. Since then there has been a change for the worse. Steel mills are barely able to keep abreast of their daily requirements. The building up of desirable inventories for next winter has not even begun.

But nothing should be permitted to slow up the flow of scrap for Victory output of steel.

Cope with your regional office of the WPB Bureau of Industrial Conservation in salvaging every piece of iron and steel that you can dispense with.

**The
CHARLES
DREIFUS
Company**

(Broker in Iron and Steel Scrap for 41 years)

Philadelphia, Pa.
Widener Bldg.
Rittenhouse 7750

Pittsburgh, Pa.
Oliver Bldg.
Atlantic 1856

Worcester, Mass.
Park Bldg.
Worcester 6-2535

utilized; and other small businesses are readily adaptable, he said. Twenty-three mills were named as engaged in re-rolling rails and some new billet steel, employing 10,000; and 11 mills produce flat rolled steel products.

By concentrating rail re-rolling in 12 mills, these firms could operate full-time and make a profit, and the other 11 could be converted to the production of armor plate. In addition to the 11 firms that produce flat rolled steel production and which have the equipment and experience that make them easily convertible to armor plate production, Mr. Murray cited typical plants of the giant steel corporations that could be included in an armor plate subcontracting program. The Shenango, Vandergrift, and Canonsburg works, he claims are examples of such plants.

Corporate greed of most of the operators of continuous strip mills is the reason for the lack of an adequate supply of steel plates for the shipbuilding program, Mr. Murray claims.

Ickes Calls For Sponge Iron Plants

Washington

• • • Although WPB has discarded all sponge iron processes as impossibilities, save one which still is being tried and despite the fact that the processes are to be the subject of a Senate Committee investigation, Secretary of the Interior Ickes has announced that he is asking the Bureau of Mines "to help remove the bottleneck in steel for cargo ships and tanks and guns by bringing in sponge iron to make up for the shortage of scrap iron and steel."

In disregarding the action of WPB, Mr. Ickes did not indicate how many sponge iron plants he intends to "bring in" or how he would get the material for their construction, a matter that apparently will make it necessary for him to seek priorities from the board he is seeking to bypass.

His disclosure of plans to "bring in" sponge iron plants was made in connection with the announcement of an ambitious undertaking set for the Bureau which, it was said, has been reorganized "in order to speed the expanded program of providing strategic and critical materials for the Nation's war needs."

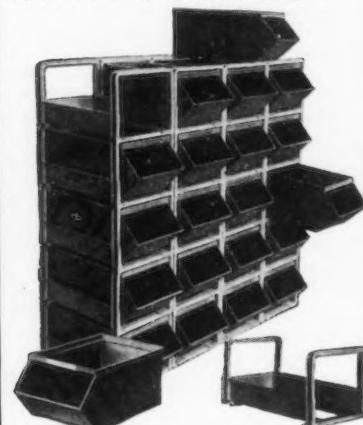
FREE FLOW of parts-in-process

You can save valuable hours spent looking for parts in stockroom boxes that must be piled and unpiled. You can end the time-waste transferring parts from bins to tote pans and back to bins again. You can erect easily movable storage units in odd corners under benches, near machines. You can put every part needed for an assembly operation within easy reach and vision of an individual worker . . . any of these are easy and quick with units of the inexpensive Stackbin System.

Typical users of the Stackbin System are America's aircraft plants, quick to adopt a new, proved method of speeding production. Other users include the largest and most efficient plants in many other industries. Write—today—for the brochure "Lower Cost Storage and Handling." STACKBIN CORP., 89 Troy St., Providence, R. I.

IDEAL STOCKROOM UNIT

Is this combination of Stackbins-in-Stackracks. Parts and materials are transferred from one department to another, are used or processed and passed along in their storage container. No waste time—less loss, less damage.



STACKBINS

are individual hopper-fronted storage bins—with perfectly smooth interiors—which nest to form work units and slide in Stackracks like drawers for storage.

AS FLEXIBLE, EASY TO ASSEMBLE

as sectional bookcases, nested Stackbin sections provide temporary storage space wherever needed. Many modern plants use them as room or departmental storage "depots."

SLOPING FLOORS

permit Stackbin Assembly Bins to feed parts continuously towards the front of the bin. Tapered front design provides semi-circular set-up, so that all parts are within easy reach.

All units in the Stackbin System are constructed of heavy steel — welded for permanent rigidity.

STACKBIN

STACKED
AND



STILL
ACCESSIBLE

SYSTEM

STACKBIN CORPORATION
89 Troy St., Providence, R. I.

NEWS OF INDUSTRY

Minton Heads Ordnance Office At Pittsburgh

Pittsburgh

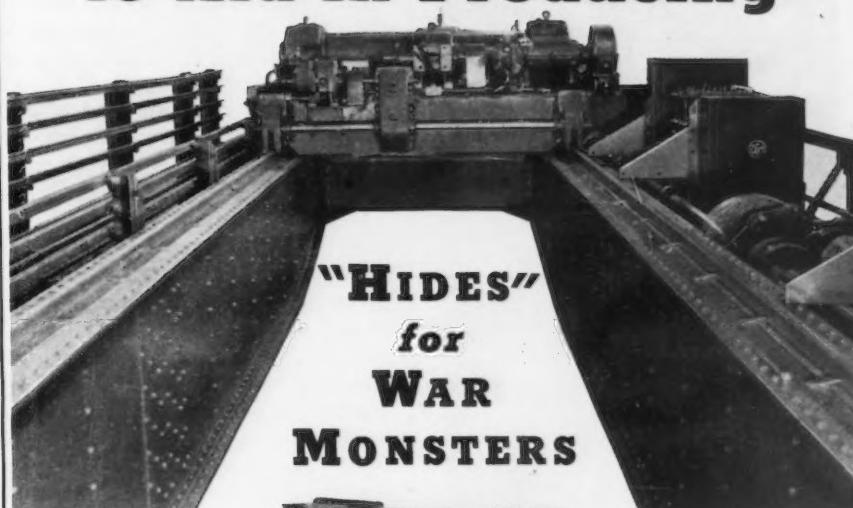
• • • Brig. Gen. Hugh C. Minton, widely known Ordnance officer, succeeded Colonel James L. Guion on July 1 as Deputy District Chief of the Ordnance Department's important Pittsburgh Ordnance office. Colonel Guion has been transferred.

General Minton graduated from Virginia Polytechnic School in 1909, the Field Artillery School (Battery Commanders' Course) in 1919, the Ordnance School of Technology in 1921 and the Army Industrial College in 1934. He is no newcomer to Pittsburgh, having served as Executive Assistant, Pittsburgh Ordnance District, from April 10, 1935, to July 1, 1938. Prior to his tour of duty in Pittsburgh, his assignments included seven years duty in Watertown Arsenal where he was in charge of the operations of the foundry; Division Ordnance officer at Camp Louis, Washington; Aberdeen Proving Ground, where he was in charge of the testing of mobile artillery and ammunition; the office of the Chief of Ordnance, as assistant to the Chief of Artillery manufacturing service; and New York City where he revised the steel plan for the office of the Assistant Secretary of War. After his Pittsburgh tour was completed, he was assigned to the office of the Chief of Ordnance as Executive Officer, to the Chief of Ordnance.

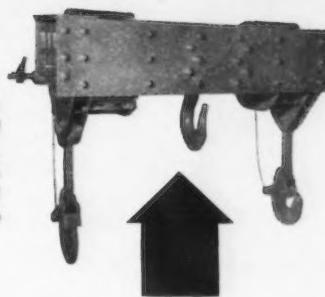
COMING EVENTS

- July 22 to 24—American Society of Civil Engineers, annual convention, Spokane, Wash.
- Aug. 23 to 30—National Association of Power Engineers, New Orleans.
- Sept. 1 to 11—Building and Construction Trades Council, Atlantic City, N. J.
- Oct. 5 to 9—National Safety Congress Association, International convention, Baltimore, Md.
- Oct. 7 to 10—The Electrochemical Society, Inc., Detroit.
- Oct. 12 to 16—National Metal Congress and Exposition, Cleveland.
- Nov. 30 to Dec. 3—American Society of Mechanical Engineers, Annual Meeting, Hotel Astor, New York.
- Nov. 30 to Dec. 5—National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.

EUCLID CRANES to Aid in Producing



A special 3 hook yoke to be handled by the 10 ton hoist. The center hook is used for general purposes while the



two outer hooks, with safety latches, handle the bale of a large ladle, keeping it parallel with the runway of the crane.

ILLUSTRATED above is one of three cranes built to speed production in a modern plant producing armor plate for battleships, tanks, armored cars, etc.

These cranes embody all the approved conventional features plus refinements and improvements of exclusive Euclid design.

Special attention was given to assure ease and speed of control, safety to operators and workmen and long service through the use of liberally proportioned parts revolving in anti-friction bearings.

Each trolley is equipped with a 30 ton hoist and a 10 ton hoist which handles the rather unusual 3 hook yoke illustrated above.

Euclid manufactures traveling cranes in a full range of sizes and capacities and a complete line of electric hoists for every type of service.

THE EUCLID CRANE & HOIST CO.
EUCLID, OHIO, Suburb of Cleveland

NEWS OF INDUSTRY

Greater Tonnage
Per Edge of Blade

A

AMERICAN
SHEAR KNIFE CO.
HOMESTEAD - PENNSYLVANIA

**Plane Firms Form
Traffic Conference**

Detroit

• • • A cooperative effort to expedite shipments of goods entering into war production of aircraft has been launched by traffic directors of aircraft companies and of automotive firms now engaged in automotive manufacture. They have formed a joint transportation organization called the Aircraft War Traffic Conference.

In a meeting in Detroit, W. J. Goehausen, traffic manager of the airplane division of Curtis-Wright Corp., was elected chairman. C. A. Sullivan, general traffic director of Fisher Body, General Motors Corp., was elected vice chairman.

Manufacturers who have affiliated as charter members are: Anderson Co.; Bendix Products Div., Bendix Aviation Corp.; Briggs Mfg. Co.; Checker Cab Mfg. Co.; Chrysler Corp.; DeSoto Div., Chrysler Corp.; Plymouth Div., Chrysler Corp.; Crosley Corp.; Ford Motor Co.; Buick Motor Div., General Motors Corp.; Cadillac Motor Div.; General Motors Corp.; Chevrolet Motor Div., General Motors Corp.; Fisher Body Div., General Motors Corp.; Graham Paige Motors Corp.; Hudson Motor Car Co.; McQuay-Norris Mfg. Co.; Murray

Corp. of America; Nash Kelvinator Corp.; Packard Motor Car Co.; Reo Motors, Inc.; The Studebaker Corp.; Thompson Products, Inc., all of whom are members of the Automotive Council for War Production, and the following aircraft companies: Beech Aircraft Corp.; Bell Aircraft Corp.; Bendix Aviation Corp.; Consolidated Aircraft Corp.; Continental Motors Corp.; Curtiss-Wright Airplane Division; Douglas Aircraft Co.; Fleetwings, Inc.; Goodyear Aircraft Corp.; Guiberson Diesel Engine Co.; Lockheed Aircraft Corp.; Lycoming Div., The Aviation Corp.; McDonnell Aircraft Corp.; Menasco Mfg. Co.; North American Aviation, Inc.; Northrop Aircraft, Inc.; Platt-LePage Aircraft Co.; Republic Aviation Corp.; St. Louis Aircraft Corp.; Vega Aircraft Corp.; Vultee Aircraft, Inc.

Kenneth A. Moore, manager of the traffic division of the Automotive Council, has been appointed manager of the Aircraft Traffic Conference.

The Conference will serve as a clearing house of research, interchange of experience, technique and information on all phases of aircraft traffic—loading and shipping, rates, classifications, bills of lading, routing and other transportation factors.



"Who's loafin'? I'm just getting my morale boosted!"

NEWS OF INDUSTRY

Steady Workers Will Be Awarded War Bonds

Cleveland

• • • For each of its employees who loses no time from June 15 to Sept. 15, the Steel Improvement & Forge Co. here will buy a \$25 war bond.

Charles H. Smith, company president, said the bonds would be awarded in addition to vacation pay, which has been substituted this year for the usual furloughs.

Production time lost due to material shortages or possible breakdowns of equipment will not be counted against any employee's work record, Mr. Smith added.

C-I Officials Study Test Black-Out

Pittsburgh

• • • Carnegie-Illinois Steel officials here took to the air last week to check various steel plants so as to be in a better position to make necessary black-outs effective. The aerial check-up was supplemental to a comprehensive plan for blacking-out steel works. At least one plant was completely blacked-out as an experiment while another location was partial. Carnegie-Illinois Steel, with Bennett S. Chapple, Jr., assistant to the vice-president in charge of operations, supervising an air raid precautionary program, is seeking to develop this project so it can be applied in the event of enemy bombing over the Western Pennsylvania district. It is not expected that steel plants, or at least those departments where production would be affected, will be blacked-out during practice raids. Machinery, organization, and personnel, however, have already been set up to effectuate as complete a black-out as possible when regulations call for this action.

New England Plants Organize Small Arms Corp.

Boston

• • • New England Small Arms Corp. has been organized by a dozen small New England manufacturers to produce materials for the government. Not one of the pool was large enough in itself to obtain a prime government contract. The pool has obtained a substantial job.



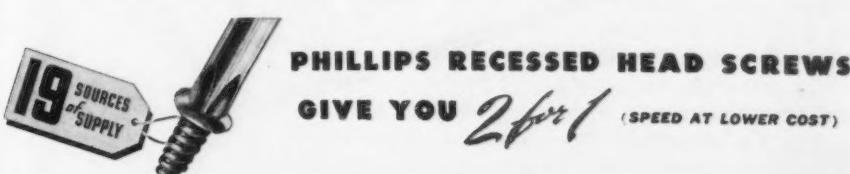
Easier Screwdriving • Freedom from Accidents • Tighter Seating = 50% Less Assembly Cost with Phillips Screws

You'd know the difference if you were doing the job. In fact, executives who have their own home workshops are usually the quickest to see the advantages of the Phillips principle and adopt it for their firm's assembly work.

It really is easy to drive Phillips Recessed Head Screws. You get a better "grab" on the screw because the driver point and Phillips recess make a snug fit. There's no danger of the driver slipping, so you don't have to spend a good part of your effort holding it in — you just keep turning. And there are more jobs on which you can use power drivers.

Translate this ease of driving into time and then time into dollars. An operator can, on the average, cut fastening time in half. Figure it out for yourself — then add the savings you get from using fewer screws (better holding power often reduces number or size of screws needed), spoiling fewer screws (no split screw heads) and eliminating the cost of resurfacing screw-driver scars.

The Phillips Screw is certainly the modern fastening method — which means "better" and "more economical." Any of the firms below can supply you.



WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS
• SCREWS WITH LOCK WASHERS

American Screw Co., Providence, R. I.

The Bristol Co., Waterbury, Conn.

Central Screw Co., Chicago, Ill.

Chandler Products Corp., Cleveland, Ohio

Continental Screw Co., New Bedford, Mass.

The Corbin Screw Corp., New Britain, Conn.

International Screw Co., Detroit, Mich.

The Lamson & Sessions Co., Cleveland, Ohio

The National Screw & Mfg. Co., Cleveland, Ohio

New England Screw Co., Keene, N.H.

The Charles Parker Co., Meriden, Conn.

Parker-Kalon Corp., New York, N.Y.

Pawtucket Screw Co., Pawtucket, R.I.

Pheon Manufacturing Co., Chicago, Ill.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.

Scovill Manufacturing Co., Waterbury, Conn.

Shakeproof Inc., Chicago, Ill.

The Southington Hardware Mfg. Co., Southington, Conn.

¹Whitney Screw Corp., Nashua, N.H.

NEWS OF INDUSTRY

J. & L. Takes Over Otis Capacity of Million Tons

• • • The Jones & Laughlin Steel Corp., increased its annual steel ingot producing capacity approximately one million tons this week when it took over the Otis Steel Co., Cleveland.

H. E. Lewis, president, Jones & Laughlin said, "Foremost consideration will be given at both prop-

erties to getting out the greatest possible production of steel for war. The workmen at Jones & Laughlin and Otis have made many outstanding production records."

An operating, marketing and distributing center at Cleveland was listed among other advantages J & L gains by the transaction. E. J. Kulas, former president of Otis, becomes a director of J. & L.

Two CIO Unions in Dispute At Pittsburgh Plant

Pittsburgh

• • • To forestall a jurisdictional fight between two CIO unions, both of which are claiming to be collective bargaining agents for its employees, the Harbison-Walker Refractories Co. has petitioned the National Labor Relations Board to determine which union it must recognize.

The company told the board the dispute exists between the United Construction Workers' Organizing Committee, which the CIO recently "dissolved" and the CIO Local Industrial Union 1196, now chartered by the CIO as successor to the UCWOC unit.

John L. Lewis, United Mine Workers' head, was reported to be claiming that the UCWOC had been absorbed into his "hybrid" UMW district 50, which among other things is attempting to organize dairymen. According to John F. LeBus, acting NLRB regional director here, the dispute will have to be decided in Washington.

The company has contracts which expire July 1 with the UCWOC covering 624 workers in four fire brick plants near Clearfield, Pa. The feud between Murray and Lewis contributed to the fracas which placed Harbison-Walker in a position where a jurisdictional dispute might have resulted in important war work being affected.

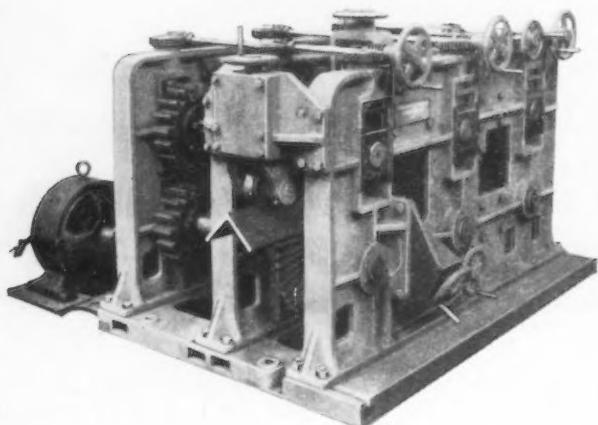
Heat Exchanger Industry Seeking Subcontractors

• • • Representatives of the heat exchanger manufacturing industry last week agreed to sub-contract some \$120,000,000 in work needed to meet greatly expanded requirements, caused by unprecedented demand from synthetic rubber plants, the petroleum industry and other fields.

The tight situation in heat exchangers and tubing was discussed in last week's IRON AGE in an article on page 96.

It is estimated about \$200,000,000 worth of heat exchangers are required by the war program before July 1, 1943. Attention is being given to plans to standardize and simplify designs.

Thomas Angle Planer • • for Shipyards



Capacity for angles up to 8" x 8"

**DESIGNED AND BUILT
BY THOMAS**

THIS Thomas motor-driven unit is designed for planing, either straight or to any angle desired . . . a vital help in today's urgent ship or barge construction. Easy to operate, speeds production, gives maximum service! Thomas builds equipment for any special metal-forming or fabricating need. Write.

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.

FABRICATING MACHINERY

NEWS OF INDUSTRY

Suggests Plan to Relieve Unbalanced Inventories

• • • In a letter to THE IRON AGE, W. D. Riecks, purchasing agent, Detroit Stoker Co., Monroe, Mich., suggests the establishment of an exchange bureau for iron and steel to relieve excessive and unbalanced inventories. His letter reads, in part:

It has been the experience of all purchasing agents that I have spoken to, who buy steel, that due to the priority system and the slow delivery of steel from the mills, it is almost impossible to keep various sizes and shapes in balance. We used to have to estimate our requirements about six weeks in advance to obtain steel from the mill, whereas now deliveries on average priorities run four to six months, with a result that one must anticipate about five months in advance. This is one of the contributing factors to unbalanced inventories and shapes.

It would be my suggestion that you set up an index system on steel, sub-dividing it into structural, hot rolled bars, cold rolled bars, plates, sheets and strips, with perhaps a section on alloy steel.

If you announce in your next issue that such a bureau was set up, any industries having an overstock of certain commodities could advise you; and shortly thereafter those being unable to obtain certain shapes or sizes of steel could write you asking whether that particular size was available from some other manufacturer's surplus stock.

This system would help the whole war production program in that it would speed up the obtainability of certain materials, and in addition would reduce excess inventories, which would otherwise be idle during the emergency.

The idea is excellent, but it is far too big for us to handle. The Distressed Stocks Unit of the WPB iron and steel branch has been working on this subject and is building up an inventory of the distressed steel on hand. Some action to move this steel is anticipated in the near future.—The Editors.

July 4 No Holiday In Steel Production

Pittsburgh

• • • Urgent need for all the steel that can be produced will result in the steel industry operating its blast furnaces, bessemer converters, open hearth and electric furnaces as well as most primary rolling mill equipment throughout Independence Day, even though it is classified as a holiday in all steel union contracts. The same condition applied last Christmas when steel companies produced steel throughout a 24-hour period.

Some finishing mills may be shut down on the Fourth of July, but since finishing mill capacity exceeds steel mill capacity, the reason for any shut-downs would be one of distribution rather than because of the holiday.

The growing shortage of scrap

and the rapid decrease in what little scrap inventories remain, coupled with expected necessary repairs to furnaces and equipment may result in no increase above current steel production for the next several months. Output for the first six months of this year exceeded production in the corresponding period last year, but with blast furnaces and open-hearth units having been pushed steadily for more than a year, some steel

operators are warning that extensive repairs might be necessary in the over all picture before the year is out. This is taken by some observers to mean that although steel companies will exhaust every human effort to produce a maximum steel output, a cycle of repairs coming at a time when scrap will not be too plentiful might bring about a lower operating rate than was maintained during the first six months of this year.

Stuart's Cutting Oil Service will help you get the most out of Minutes, Metals and Machines

Stuart's
ThredKut
HEAVY DUTY CUTTING OIL
Recommended by America's leading machine tool builders

Stuart's
SOLVOL
LIQUID CUTTING COMPOUND
For carbide tools and where an "aquamix" solution is recommended

Stuart's
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LIQUID GRINDING COMPOUND
Meets every test for the ideal Modern Grinding Compound

Stuart's
"SUPER-KOOL"
AMERICA'S FIRST TRANSPARENT SULPHURIZED CUTTING AND DRAWING OIL

OUR job is to keep cutting oil research and engineering service abreast of the progress made in machines, tools, metals and processes; to make sure the metal working industry has every advantage that modern cutting oils can make possible.

We've done that job since 1865 — done it well, industry has acknowledged.

Example after example can be cited where management and technicians of vital war products plants, government and private, have worked with Stuart Oil Engineers to solve new and difficult problems that were barriers to peak production. The key to every such solution has been found in an open-minded approach—close cooperation—in using unbiased judgement—and a determination to achieve results.

This is why we feel that you will find Stuart Oil Engineering Service helpful in solving metal cutting problems. It has been our job since 1865.



For All Cutting Fluid Problems
D. A. STUART OIL CO.
Chicago, U.S.A. • LIMITED • Est. 1865
Warehouses in All Principal Metal Working Centers

NEWS OF INDUSTRY

**Nova Scotia Steel Plant
Will Increase Capacity**

Toronto

• • • Dominion Steel & Coal Corp. Ltd., is proceeding with a new expansion program at its Sydney, N. S., works which will increase its steel making capacity from 600,000 to 675,000 tons a year. At the outbreak of war the company's rated capacity was 400,000 tons. Plans also call for a step-up in pig iron capacity from the

current rate of 490,556 tons per year to approximately 600,000 tons by the addition of another blast furnace which will give the company a total of four stacks by the end of the year.

Officials announce that for the new blast furnace installation the company is transferring the "shell" of the stack from its plant at Ojibway, Ont., secured some years ago from the United States Steel Corp., but never lined or put into production.

**Hutchinson New Chairman
Of Cincinnati Foundrymen**

Cincinnati

• • • Officers for the year 1942-43 were elected recently at a meeting of the board of directors of the Cincinnati Chapter, American Foundrymen's Association. The officers elected are: Chairman, Frank E. Hutchinson, vice-president and general manager of the Reliance Foundry Co.; vice-chairman, Edwin King, sales manager of the Hill & Griffin Co.; reelected secretary, Henry M. Wood, local manager of the W. W. Sly Mfg. Co.; reelected treasurer, Larry Gosiger, manager of the S. Obermeyer Co.; appointed chairman of membership was Charles Hilb, and entertainment chairman, William Gilbert.

Members elected to the board of directors June 16 were sworn in at the meeting. They are William Beiser, William Gilbert, David Longueville and William Rendering. Other members of the board of directors are William Ball, immediate past chairman; Martin Milligan, Herschel Kautz and J. W. Nichols.

De Laval Awarded "E"

• • • Outstanding achievement in the production of turbines, pumps, gears and other vital equipment for vessels of the United States Navy was rewarded by the presentation of the cherished Navy "E" for excellence to the DeLaval Steam Turbine Co. of Trenton, N. J., on Monday, June 29.

HITLER LEAVE: Industry's fight against absenteeism, is taking many forms. This cartoon shows one of the ways R. G. LeTourneau, Inc., is attacking the problem.



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MEAKER!

Equipment for

GALVANIZING

(Electro Process)

PICKLING

CLEANING

PLATING

At your Service . . . the country's leading practical plating engineers.

ADDRESS:

The **MEAKER** co.

1635 So. 55th Ave., Chicago

NEWS OF INDUSTRY

7 Companies Will Build Wood Barges

Washington

• • • Announcement was made last week by the Maritime Commission of contracts for the construction of 28 wooden barges to seven shipbuilding companies on the Atlantic and Pacific Coasts and the Great Lakes.

Chrysler Institute Graduates Hear Brig. Gen. Henry

Detroit

• • • Brig. Gen. Stephen G. Henry, commandant of the Armored Force School at Fort Knox, Ky., known as the "Blitz College," addressed graduates of the Chrysler Institute of Engineering here on Thursday, June 25, and told them that technical jobs in war production may be as valuable to victory as jobs on the battlefield. He urged graduates not to rush into the Army "unless you are certain you are of more value there than in civilian life."

"If we take into the armed services a man who is more valuable here in one of Detroit's great war plants, it is only an economic loss to the nation," Gen. Henry told the graduates at ceremonies in the Horace H. Rackham Educational Memorial.

One hundred students received degrees, diplomas, or certificates at this, the ninth annual graduation exercises of the Chrysler Institute. Twenty students were awarded Master of Automotive Engineering degrees.

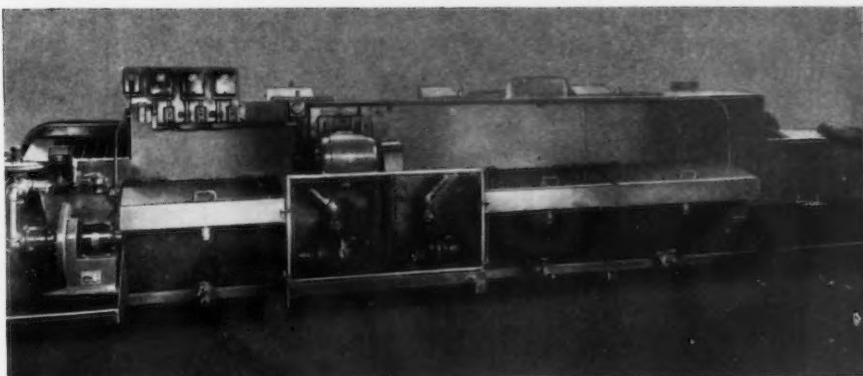
New A.S.T.E. Chapters Elect Permanent Officers

• • • First permanent officers of the newest chapters of the American Society of Tool Engineers were elected when "Little Rhody" Chapter No. 53 of Providence, R. I., and Louisville, Ky., Chapter No. 54 held their initial annual meetings. Edward J. Berry, tool supervisor of the Universal Winding Co. of Providence was named chairman of the Rhode Island Chapter and Kenneth C. Jasper, tool supervisor of the Westinghouse Ordnance Division was elected head of the Louisville group.

Other officers of "Little Rhody" Chapter are George H. Nye, president, Circular Tool Co., first vice-chairman; John E. MacArthur, works manager, Hemphill Co., second vice-chairman; Earl R. Phinney, design engineer, Taft-Pearce Mfg. Co., secretary; Albert W. Rogers, production control engineer, Universal Winding Co., treasurer.

Frederick Brown, president of

the Talking-Weigh Machine Co., was named first vice-chairman of the Louisville Chapter; Fred W. Fieldhouse, president, Fieldhouse Engineering Corp., second vice-chairman; Sauter F. Reichert, foreman, brass tool department, American Radiator - Standard Plumbing, secretary; John Thomas, general foreman, gun erection dept., Westinghouse Ordnance Division, treasurer.



PROVED on the production line

THIS RANSOHOFF METAL CLEANING MACHINE was developed especially for the efficient cleaning of 75, 90, 105 and 155 mm. projectiles. Its practical application on the production line, washing, rinsing, and rust-proofing, has proved its ability to more than meet expectations. Many valuable man hours are saved, production increased and cleaned products readily take a better final finish.

Don't let old fashioned methods of cleaning metal parts handicap your operations. With the demand for more and more production in faster time, it is essential that cleaning equipment be efficient.

That's why Ransohoff Metal Cleaning Equipment is in great demand by manufacturers, engaged in the production of war material. They well know the many advantages of Ransohoff Equipment built to their exact requirements. Speed is most essential to you and we can supply definite information promptly.

Write or wire Dept. "IA" for catalog or further information.

N. RANSOHOFF, Inc.
METAL CLEANING SPECIALISTS
TOWNSHIP AND BIG FOUR R. R. **CINCINNATI, OHIO**

OPA Slashes Bar Price For 2 Agencies; Calls For Cost Data

• • • Important changes to Price Schedule 6 covering iron and steel products became effective Tuesday, June 30, under Amendment No. 6, announced last Friday. Briefly, the changes involve: (1) A requirement that producers file data covering conversion or processing charges; (2) New rules clarifying extras applicable to carbon and alloy cold finished bars; (3) Changes affecting concrete reinforcing bars, with the base price for unfabricated bars set at 2.15c. and the TVA and Bureau of Reclamation allowed functional discounts.

The full text of the amendment is published herewith.

The changes contained in the amendment represent for the most part a continuation of OPA's overall study of extra charges in the steel industry. The clarifications on cold finished carbon and cold finished alloy steel bars were somewhat similar in nature to rulings announced several weeks ago on some flat rolled steel products. The tendency is for OPA to make sure that no extras are being charged for work which is either not done or which is not necessary to produce the results desired by the fabricator of the steel product. These changes have been discussed with the steel advisory committee on a particular product involved as well as the general steel products advisory committee—OPA's industry groups. In the case of the cold finished bar extra charges, the OPA admitted that at least some members in the industry have already voluntarily adopted the revised practices so that the amendment "to some extent" merely standardizes existing price practices. To some extent the same condition applies on the publicity and the request for data on conversion of processing charges, namely, most of these transactions are being carried out scrupulously within the framework of OPA's maximum prices but the information requested by OPA will cover the few cases that did exist or now exist where the steel mill performs conversion services without taking title to the steel.

Commenting on its new rule that producers must file data on conversion or processing charges, OPA said: "It is expected that the information pertaining to the conversion charges made in such operations as the conversion of billets into rods, or bars, or on such processing operations as annealing, will be of value in ascertaining whether such steel is being delivered to the ultimate consumer at reasonable prices, and whether any regulation of such charges in the steel industry may in the future become necessary."

Price Administrator Henderson said that in the past, steel mills have sometimes purchased billets or other steel from persons who were able to obtain such steel on the market and have processed or converted it under an agreement to resell. In these cases, the purchases by the steel producer and subsequent resale to the former owner have been at ceiling prices. With these sales, the OPA is not greatly concerned so long as the prices are within the permissible maximums,—Mr. Henderson said.

"However, in some cases," he added, "the practice has been for the owner of the steel to turn it over to the producer for processing and converting and for the steel mill to perform these services without taking title to the steel. In this latter case, a conversion or processing charge is made. It is with regard to these charges that information has been found to be desirable. It is expected that information pertaining to the conversion charges made on such operations as the conversion of billets into rods or bars, or on such processing as annealing and heat treating, will be of value in ascertaining whether such steel is being delivered to the ultimate customer at reasonable prices, and whether any regulation of such charges in the future will be necessary."

The new cold finished steel extras are designed to eliminate possibilities for the charging of several overlapping extras on the same product, according to OPA.

The paragraph on concrete reinforcing bars makes definite the conditions under which producers are required to give the discount of 25c. and makes clear that it shall be extended TVA and the Bureau of Reclamation. Discounts which have customarily been granted by individual producers, beyond the 25c. discount to fabricators and to TVA and the Bureau of Reclamation, are also continued in existence:

Text of Amendment

PART 1306—IRON AND STEEL
[Amendment 6 to Revised Price Schedule 6¹]
IRON AND STEEL PRODUCTS

A statement of the considerations involved in the issuance of this amendment has been issued simultaneously herewith and has been filed with the Division of the Federal Register.

A new paragraph (c) is added to § 1306.5. A new subparagraph (3) is added to paragraph (h) of § 1306.8. Paragraph (g) of § 1306.10 is amended to read as set forth below:

§ 1306.5 Records and reports. * * *

(c) Every producer of iron or steel products who converts or processes in any manner a steel product owned by a person other than the producer and charges a fee to such other person, shall file with the Office of Price Administration a brief statement setting forth the type and quantity of steel converted or processed, the name of the owner, the nature of the operation, and the fee charged for such operation. Such information need not be filed in cases in which the steel is purchased by the producer and resold to the original owner. Filing under this provision shall be made within ten days after the initiation of each such operation. Each producer shall also file such information for the period April 1, 1942, to June 30, 1942 inclusive, such filing to be made prior to July 15, 1942.

* * * * *

§ 1306.8 Definitions. * * *

(h) * * *

(3) The extras or other charges which may be charged on sales of cold finished steel bars and shafting shall be as established in subparagraphs (1) and (2) above: *Provided*, That:

(i) With respect to sales of cold finished carbon steel bars and shaftings:

(a) The extra of \$.10 per hundred pounds for magnetic testing may be charged only when the specification expressly calls for magnetic testing, or when the specifications for surface seams and other defects of this type are sufficiently critical so that mag-

¹ 7 F.R. 1215, 1836, 2132, 2153, 2298, 2299, 2351, 3330.

PRICES

netic testing is necessary to determine whether or not the material will be acceptable.

(b) The extra of \$.25 per hundred pounds for United States Government specifications requiring physical inspection or physical testing is restated to read for "U. S. Government specifications requiring physical testing," and this extra may be charged only when the steel is produced to definite physical specifications requiring tensile, impact, fracture, or similar tests.

(c) The extra of \$.10 per hundred pounds for U. S. Government specifications requiring chemical inspection or chemical testing is eliminated and such extra may not be charged.

(d) The extra of \$.15 per hundred pounds for extensometer testing may be charged only when the use of this instrument is specifically required in the specification, and this extra may not be charged when the extra of \$.25 per hundred pounds for physical testing is charged.

(e) Extras for quality, such as "special requirement quality" and "shell quality," may be charged only when and in the amount that such extra has been charged by the producer of the hot rolled steel from which the cold finished steel is made. In the case of producers making both the hot rolled and cold finished bars, such extras may be charged only when properly applicable to the hot rolled bars.

(f) When strain and stress relieving or stabilizing by baking is specified or required to meet physical requirements of the U. S. Army and Navy specifications for 20 mm, 1.1", 37 mm and 40 mm shells and other ammunition components covered by U. S. Army Specifications 57-107-29, AXS-485, and AXS-605, and U. S. Navy Specifications OS-1231, OS-829, Grade C, and OS-829, Grade D (Class 2) and similar Army, Navy, Lend-Lease, British or other specifications, the extra of \$.75 per hundred pounds for annealing or normalizing may be charged, but such charge shall include all charges for physical testing, including magnetic testing and use of extensometer, and no other extras for physical testing may be charged.

(ii) With respect to sales of cold finished alloy steel bars:

(a) On analyses of alloy steels for which chemical extras and extras for alloy content are not included in the standard extra lists, the applicable charge for chemical composition and alloy content shall be calculated from the list of extras for hot rolled alloy steel bars as published and filed by the Carnegie-Illinois Steel Corporation.

(b) On U. S. Government specifications requiring physical testing such as tensile, impact, or fracture testing, an extra of \$.25 per hundred pounds may be charged: *Provided*, That when this extra is charged, the extra of

\$.25 per hundred pounds for use of extensometer shall not be charged: *Provided further*, That this extra shall not be charged when the steel is heat-treated and/or stress relieved by the cold finished bar producer.

(c) The extra of \$.10 per hundred pounds for U. S. Government specifications and/or inspection may be charged only when such extra has been charged by the producer of the hot-rolled steel from which the cold-finished steel is made, or, in the case of integrated producers, only when applicable to the hot rolled bars.

(d) The maximum extra which may be charged for the stamping of heat numbers and symbols on one end of individual bars shall be \$.25 per hundred pounds regardless of the number of stamps which may be required.

(e) When bars in the form of rounds or hexagons are furnished in coils, a discount of \$.15 per hundred pounds shall be deducted from the selling price.

(f) The extra of \$.50 per hundred pounds for steel guaranteed free from decarburization may not be charged when the steel is turned, turned and polished, or turned, ground, and polished.

(iii) Where the rules and interpretations as listed above mention "U. S. Government specifications," this term shall include British, Russian, and other governmental specifications of a similar nature, and also other specifications designed to procure steel for ordnance purposes.

* * * * *

§ 1306.10. Appendix A: Domestic and export ceiling prices for sales by producers of iron and steel products.

* * *

(g) (1) The maximum base price for carbon steel ingots, rerolling quality, standard analysis, shall be \$31.00 per gross tons, f.o.b. mill.

(2) The maximum basing point base price for unfabricated new-billet concrete reinforcing bars shall be \$2.15 per hundred pounds, subject to the following mandatory adjustments:

(i) A discount of \$.25 per hundred pounds on orders released for shipment to one destination at one time and in quantities of 20 tons or more of one size and one length 30 feet or over or in random mill lengths, when such sales are made to persons in the business of fabricating such reinforcing bars for resale and who maintain warehousing facilities, equipment for cutting and bending and engineering services. This paragraph shall apply to direct purchases by the Tennessee Valley Authority and the Bureau of Reclamation.

(ii) Such other functional or customary discounts to contractors, jobbers, brokers, or others as each individual producer was granting on April 16, 1941, and is required to maintain by § 1306.10. (i).

(iii) Such differentials as are allowed or enforced by other sections of paragraphs of Revised Price Schedule No. 6 in the case of Gulf ports, Pacific ports and other delivered price areas.

§ 1306.9a. Effective dates of amendments. * * *

(f) Amendment No. 6 (§§ 1306.5 (c), 1306.8 (h) (3) and 1306.10 (g), as amended) to Revised Price Schedule No. 6 shall become effective June 30, 1942.

(Pub. Law. 421, 77th Cong.)

Issued this 26th day of June, 1942.

LEON HENDERSON,
Administrator.

[F. R. Doc. 42-5986; Filed, June 26, 1942;
10:51 a.m.]

↓
**Changes Mean Sizable
Price Reduction for TVA**
Pittsburgh

• • • While the expected clarification of concrete bar prices as they are to be charged by producers and as contained in Amendment No. 6 to Iron and Steel Price Schedule No. 6 ties in with the fabricated concrete reinforcing bar price ceiling, the amendment went further than "clarification." Major feature which will probably cause pressure from other large concrete bar buyers was the certification of TVA and the Bureau of Reclamation as being in the same category as concrete bar fabricators, thus entitling them to a price of \$1.90 a 100 lb. on direct orders involving 20 tons or more of one size and one length 30 ft. or over, for shipment to one destination at one time. For months past these two interests have been paying \$2.15 a 100 lb. base price on concrete reinforcing bars and the recent ruling effective June 30 will mean a sizable reduction in prices paid by the groups as well as in steel company receipts.

Among other things deduced from the amended iron and steel price schedule is that the base price on concrete bars which are not specifically cut to length and which are not entitled to a functional discount is set at a maximum of \$2.15 a 100 lb. and the use of the word "unfabricated" new billet reinforcing bars in the order is taken by some to mean that steel companies shipping fabricated concrete bars from their own fabricating plants would be entitled to use a base price of \$2.40 a 100 lb. From an overall standpoint it could prob-

PRICES

ably be said that any concrete bars which are cut to specific lengths upon order of the customer will be predicated on a base of \$2.40 a 100 lb.

Even though some steel companies may have the legal right to charge a base price of \$2.40 on fabricated concrete bars, there are some who may continue to charge \$2.15 a 100 lb. If for no other reason than the competition

among steel makers for A-1-a business.



C. F. & I. Given Relief

• • • Colorado Fuel & Iron Corp., of Denver, has been granted permission to pass on to the buyer a larger share of heavy freight costs on shipments of iron and steel

products to the Eastern seaboard for the account of the Lend-Lease Administration.

In Order No. 14 under Revised Price Schedule No. 6 on iron and steel products, effective June 30, Colorado Fuel & Iron is permitted on sales for lend-lease account to charge maximum Chicago basing point prices, freight on board, Minnequa, Colo.

"On shipments made for the account of the Lend-Lease Administration to the Eastern seaboard, Colorado Fuel & Iron was compelled to absorb an exorbitant amount of freight," OPA said. "Although such shipments were 'dislocated tonnage,' the relief afforded under the schedule's terms —the use of an emergency basing point— would not alleviate the freight absorption which the company was compelled to make. The emergency basing point for shipments of iron and steel products by the company is Chicago. Shipments into the Chicago area or beyond would normally not be made by the company, since any such shipments would involve much greater than usual freight absorption. For these reasons, Colorado Fuel & Iron has been granted permission to sell iron and steel products for the account of the Lend-Lease Administration on an f. o. b. mill basis."

Similar relief on all lend-lease shipments to the Eastern seaboard was granted last month to Sheffield Steel Corp. of Kansas City.



OPA Warns Against LCL Shipments for Higher Prices

• • • Sales of iron and steel products in quantities just under carload weight with the view of obtaining the higher prices permitted for less-than-carload shipments is an evasion of Revised Price Schedule No. 49 on such products, Price Administrator Henderson warned June 25.

"Schedule No. 49 provides that mill carload prices shall be charged for straight carloads sold out of warehouse stock," said Henderson. "The schedule establishes 40,000 lb. as a minimum carload shipment on iron and steel products with the exception of rails, where a minimum carload lot is 56,000 lb."

"Splitting of orders into near

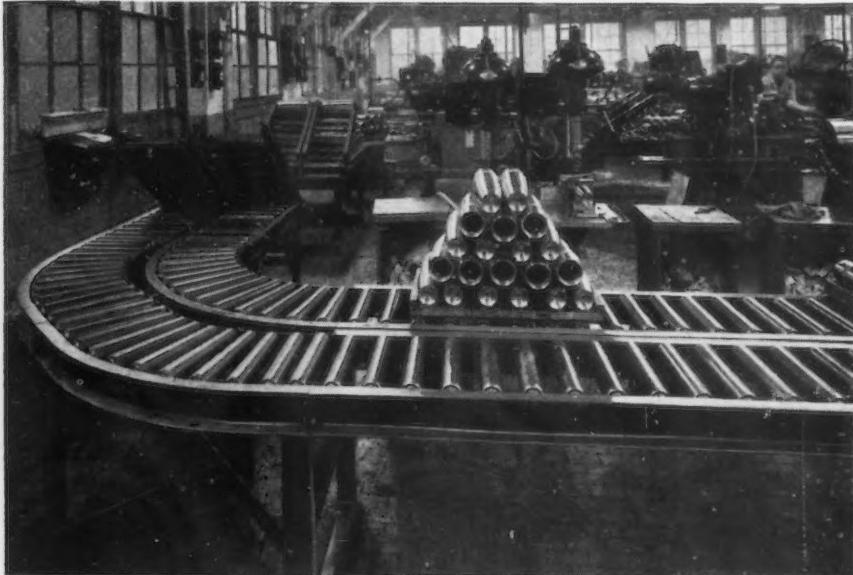
SERVING THE SINEWS OF WAR!



supplies for peace-time products are now carrying the sinews of war in a constant stream of sustained, orderly production. If your production requires a faster tempo, it is quite possible that we, here at Mathews, can be of assistance. A word from you will bring complete information and engineering service.

DOUBLED CAPACITY FOR WAR PRODUCTION

Stepping up our productive capacity month after month has barely enabled us to keep pace with mounting war orders. As long as this condition exists, it becomes increasingly difficult to meet civilian requirements. Our one big job is the handling of war material. That job must come first.



MATHEWS CONVEYER COMPANY ELLWOOD CITY, PENNA.

Field Engineers and Sales Offices located in 30 Industrial Centers.

PRICES

carload shipments or encouraging customers to place orders for not over 39,999 lb. with the intent of getting the higher less-than-carload price is an evasion of the law.

"The flat statement by a seller that 40,000 lb. orders will not be accepted, the obvious intent being to force the buyer to split a 40,000-lb. requirement into quantities commanding a higher price, is an evasion."

Henderson said, "the WPB now exhibits carload shipments from warehouses, other than mixed cars except on certification. This is not to be construed, however, to mean that the WPB legislates generally against shipments in carload quantity from warehouses. They may exclude specific shipments for specific reasons, but it is their wish, along with OPA that a certified carload shipment be made at proper carload price as established by OPA.

"OPA has established a reasonable maximum price for a mixed car, containing not less than three product items or one product item of not less than ten specific sizes and/or gages. This covers normal warehouse business, for seconds dealers as well as warehouses handling primes.

"For straight carload shipments necessitated by the war effort, OPA will fix a price on certification by the WPB.

"Unassorted cars, sold by 'seconds' dealers, are, and should be priced at not higher than mill price for comparable products of prime quality. In ordinary times, these are priced at less than mill price for prime material.

"In many cases a warehouse or 'seconds' dealer selling at mill price a straight car of a product like strip picks up enough on the conversion from sheets to realize a substantial profit."



Aluminum Cuts Delayed

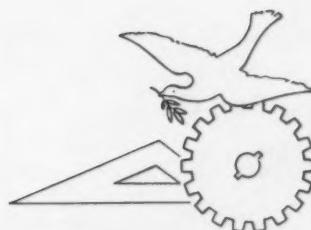
• • • Reductions in prices of fabricated aluminum products previously scheduled by OPA to take effect July 1, have been postponed until Aug. 1. The reductions, which are substantial, will result in large savings to the government, particularly in connection

with the airplane production program.

Originally scheduled to become effective on June 15, the reductions were postponed to July 1 in order to allow additional time for the industry to make adjustments to the new prices. The further deferment of the effective date was made necessary because of the magnitude of the readjustment involved.

Trading Excepted, 6 Other Changes in Ore Schedule

• • • Trading or exchanging of iron ore between producers has been excepted from the provisions of Price Regulation No. 113, which covers iron ore production in Minnesota, Wisconsin and Michigan. Six other changes were made by Amendment No. 1 to the regulation.



FOR THE DURATION—AND AFTER

Pioneer engineers are today devoting themselves to the purpose of helping manifold industries to adjust themselves to the new order of things.

In hundreds of plants we have helped to convert peacetime production to wartime output.

Looking ahead—when this is all over—we'll be needed even more than ever to help rehabilitate industry. We know, as you do, that peacetime production will not be picked up where it was left off; it will be replete with new problems.

Although our organization has always been composed of the best talent and experience available, the varied nature of the problems and products we are encountering today has added much to our extensive experience.

The advantage this broadened versatility can bring you should be obvious.

**PIONEER ENGINEERING
AND MANUFACTURING COMPANY
19649 JOHN R STREET, DETROIT, MICHIGAN**

PRICES

tion, which becomes effective July 2.

The amendment effects the following:

1—Excludes exchanges or trades of ore from the regulation, but requires, however, the submission of reports on certain types of exchanges or trades.

2—Provides for the deduction of allowances for shrinkage, insurance and analysis.

3—Clarifies the provision relating to escalator clauses in long-term contracts.

4—Places sellers under long-term contracts for delivery at the mine or at Upper Lake ports on the same basis as other sellers with respect to freight absorption.

5—Clarifies the provision covering new sellers to include sellers of classifications or grades of ore not sold in 1941.

6—Excludes from the regulation ore mined in Minnesota south of Minneapolis.
7—Establishes Granite City, Ill., as in effect a new alternate basing point.

OPA said the first and second changes are made in recognition of practices customary in the trade; the third, fourth and fifth clarify provisions of the regulation; and the sixth and seventh add new provisions to the regulation.

When one producer exchanges or trades ores with another producer, no formal report need be made to OPA, although a record of

such deals must be kept in the company's books so as to be available for OPA inspection.

However, producers making exchanges with consumers of ore must submit statements of such deals to OPA within 15 days after the date of the contract.

Describing the clarification of escalator clauses, Price Administrator Henderson said:

"It was intended by the price order to freeze prices of iron ore at the 1941 level. Prices under long-term contracts which contained escalator clauses, permitting increase in price to cover increased costs of production and transportation, were to be held to the level of escalation reached in 1941. Where the long-term contract called for an increase in the price itself, rather than in the cost component, it was also intended by the Regulation to limit any increases to the level reached in 1941. An uncertainty on this point which existed in the wording of Section 1369.1 is resolved in Amendment No. 1.

"Producers who in 1941 did not take full advantage of the escalation clauses in their contracts and waived a portion of the price which they could have charged are held to the amounts actually received in 1941, and are not allowed to charge prices to which they might have been entitled had it not been for the partial waiver of the escalation. A different rule would result in allowing in effect an increase in price for 1942 to producers so situated, which would be unfair to spot sellers and other long-term sellers. It would also penalize buyers, whose own selling prices are frozen at the 1941 level."

In regard to clarification of freight absorption by long-term sellers at the mine or Upper Lake ports, the Price Administrator pointed out that Lake ore carriers have increased their freight rates for the shipping season of 1942 by 3c. a ton. As the regulation is drawn, this freight increase in the case of sales of ore at the mine or Upper Lake ports under long-term contracts is absorbed by the buyer, who is thus paying a higher price for the ore than he paid in 1941. In the case of sales at Lower Lake ports, however, the freight increase is absorbed by the seller. This inequality is removed by Amendment No. 1, which requires the maximum price to be calculated on a Lower Lake base, and results in the absorption of the increased freight by the seller.

Amendment No. 1, in another clarification, provides that any persons who did not sell a particular classification of standard ore or particular grade of special ore in 1941 may sell such an ore at a price not higher than the weighted average spot price for comparable ore of a seller situated in substantially similar circumstances. Such price may be obtained on application to OPA.

In one of the two new provisions, the Amendment excludes from Regulation No. 113 any ore produced in Minnesota south of Minneapolis, pending further OPA study. Because of the newness of mining development in Southern Minnesota, the provisions of the



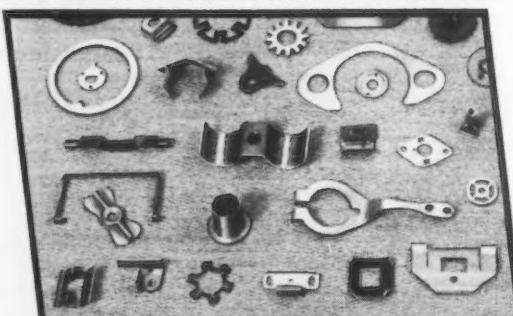
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With years of experience in the manufacture and application of parts like these, we can offer suggestions and recommendations on the kinds, types and designs to use, how to make them most effective in your products, and how to apply them most quickly and economically.

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M-D-HUBBARD SPRING CO.

331 CENTRAL AVE. • PONTIAC, MICH.

NEWS OF INDUSTRY

regulation are not suitable to such operations. Amendment No. 1 also establishes Granite City as in effect a new alternating basing point. The emergency of that city as an ore-consuming center has created a new pricing problem because some members of the industry treat it as a new basing point. Some sell ore for shipment to Granite City at the same mine prices as they would charge for ore going to Lower Lake ports, but others absorb part of the freight differential. The amendment permits each seller to charge customers in each base point the same price as its average in 1941. If preferred, the seller may include sales to Granite City in the Lower Lake weighted average spot prices and in that case sales to Granite City are to be governed by such prices.



Expected Wage Boost and Lend-Lease Costs Weighed Pittsburgh

• • • Already facing the possibility of reduced earnings because of an expected wage increase in the steel industry, steel concerns supplying huge quantities of lend-lease ingots and billets will find their cost increased or at least their income decreased due to a larger percentage of output going into semifinished material. Some intricate problems which have a direct bearing on a smaller overall return because of lend-lease business include loss of home scrap which must be made up other ways, idle finishing mill equipment because steel is lacking, less return on the manufacture and sale of semi-finished material, and a general disruption of overall rolling schedules.

Trade Notes . . .

GASKET PACKING & SPECIALTY CO., INC., has moved to 298 Broadway, New York.

PACIFIC TOOL & SUPPLY CO., Los Angeles, has changed its name to Brand Tool & Supply Co.

LODGE & SHIPLEY MACHINE TOOL CO., Cincinnati, will be represented by the following companies in the sale of lathes and duomatics in the area formerly covered by Henry Prentiss & Co., who have retired from business: General Machinery Corp., 140 Federal Street, Boston, John Tierney, manager, to cover Massachusetts, Rhode Island, Maine, New Hampshire and Vermont; Wilson Brown Co., Chrysler Building, New York, Dan Harrington, manager, to cover eastern New York, northern New Jersey, and Connecticut; C. H. Briggs Machine Tool Co., Syracuse, C. H. Briggs, president, to cover northeastern Pennsylvania and central New York; George Keller Machinery Co., Buffalo, E. F. Morgan and J. A. Carter, associates with Mr. Keller, to cover Buffalo and Rochester areas.

C. H. BRIGGS MACHINE TOOL CO., which was formerly with Henry Prentiss & Co., will represent, in addition to Lodge & Shipley, the following manufacturers of machine tools: Abrasive Machine Tool Co., Acme Machine Tool Co., Avey Drilling Machine Co., Blanchard Machine Co., Cincinnati Bickford Tool Co., Cincinnati Planer Co., Giddings & Lewis Machine Tool Co., Gould & Eberhardt, Moline Tool Co., Racine Tool & Machine Co., and V & O Press Co.

JOHN INGLIS CO., LTD., Toronto, has obtained Canadian rights for manufacture of products of Worthington Pump & Machinery Corp., Harrison, N. J.

THE FOUNDRY DIVISION OF NORTH WALES MACHINE CO., INC., North Wales, Pa., is to be known as King Foundries, Inc. There is no change in management or employees, but the two groups will operate as separate companies.

E. W. BLISS CO., Brooklyn, N. Y., large manufacturers of metal working equipment, have been granted the manufacturing rights for Meehanite castings at their foundry in Hastings, Mich., according to the Meehanite Metal Corp., Pittsburgh.

MACHINING TIME Reduced 70%

DOWN TIME Reduced 50%

with KENNAMETAL* tools

STYLE NO. II

In machining the butt weld flashing of high speed steel cylinder illustrated above, KENNAMETAL tools turned 30 pieces per grind as compared to 6 pieces per grind obtained with high speed steel tools. In addition, KENNAMETAL was used at 120'/min. while maximum speed with high speed steel tools was 80'/min. KENNAMETAL also did the work in one cut, while two cuts were required with high speed steel. In short, KENNAMETAL reduced machining time 70 per cent.

If you are working on war orders, machining steels hardened up to 550 Brinell, KENNAMETAL can help you get out more work per shift. KENNAMETAL tools cut at speeds 2 to 6 times faster than are possible with high speed steels, removing 3 to 10 times as much metal between regrinds. Write for the KENNAMETAL Vest Pocket Manual, showing how to get the most from your KENNAMETAL Tools in production.

*INVENTED AND MANUFACTURED IN U. S. A.



MCKENNA METALS Co.

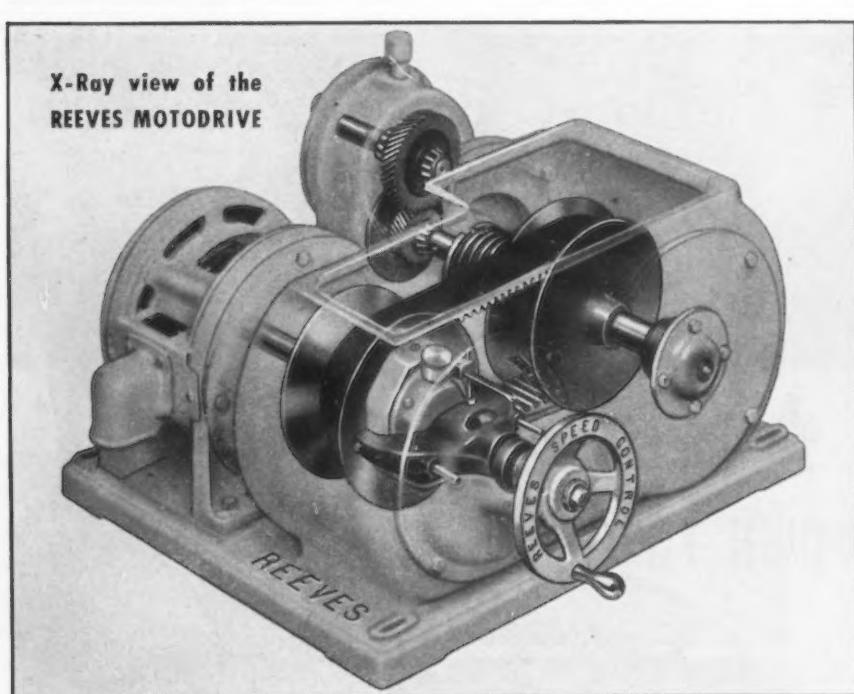
144 LLOYD AVE., LATROBE, PENNA.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York
(Exclusive of Canada and Great Britain)

Survey of State-Owned Construction Equipment

• • • A survey of all construction equipment owned by highway departments of the various states and other local government units has been completed by the WPB Bureau of Governmental Requirements, and is now available for use by all government agencies. The survey, the first of its kind, has been completed under the direction of Louis

Levenson, chief of the construction equipment section of the bureau. Answers to questionnaires have been received from all states having highway departments. Responses were also received from virtually all of more than 3000, counties sent questionnaires, 1100 cities of 10,000 population and over, and 3500 cities and towns under 10,000. The survey as completed lists 34 types of equipment, with details of age and condition.



REEVES Motodrive

Combines Motor, Variable Speed and Gear Reducer (if needed) All in One Compact Unit

• Here is a complete variable speed power plant for production machines where space is limited, or where direct connection to machine is desirable. Utilizes proved REEVES principle of V-belt driving between two pairs of cone-faced discs to provide an infinite number of driving and driven diameters. Any desired speed—not just "steps"—between pre-determined limits is available at turn of handwheel—without stopping driven machine. Not restricted to any one make of motor. Vertical and horizontal designs with or without speed reducer. Sizes 1/4 to 10 h.p.; ratios of speed change 2:1 through 6:1. Send for booklet, IG-423, "More Output Through Variable Speeds," showing how war production is being speeded up by use of REEVES units—Motodrive, Transmission, and Vari-Speed Motor Pulley.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Reeves Speed Control

Bureau of Standards Issues Simplified Practice Program

• • • Every unnecessary operation in our war plants reduces productivity of the man power and every hesitation in the movements of material through the channels of production and distribution reduces the effectiveness of the material. With this in mind, the National Bureau of Standards set out upon a program of Simplified Practice, and arrived at recommendations to practically all industries. Simplified Practice reduces excessive variety of manufactured products and reduces the methods used and the handling of material.

The recommendations developed are by voluntary cooperation among manufacturers, distributors, consumers, and other interests, through a regular procedure of the Bureau. This procedure is designed to insure not only the initial success of the program, but also its regular review thereafter and revision when and as often as necessary to meet changing technological and economic conditions.

Some of the obvious advantages gained from the Simplified Practice program by various participants are:

To The Manufacturer: Longer factory runs with fewer changes; less idle equipment; fewer idle man-hours; less capital tied up in slow-moving stocks; simplified inspection requirements; less special machinery; more prompt delivery; less chance of error in shipment; and larger production-units.

To The Jobber, Wholesaler, and Retailer: Increased turnover; elimination of slow-moving stocks; staple lines, easy to buy and quick to sell; greater concentration of sales efforts on fewer items; less storage space required; and decreased overhead and handling charges.

To The Consumer: Better values than otherwise possible; better service in delivery and repairs; and better quality of products.

The recommendations of the Bureau for simplification may be applied quickly as an emergency measure to meet wartime needs, for conservation of materials, for control of inventories, and, after the war, to eliminate the unnecessary multiplication of variety which occurred in many fields following the last war.

The reductions that can be af-

NEWS OF INDUSTRY

fected by the application of simplified practice cover all fields and all types of products. For example, at present there are 66 varieties of steel drums and barrels, but after simplification 26 types could take care of all present needs, a reduction of 62 per cent of the number of such articles not manufactured. Some 292 different styles of iron and steel roofing are now being manufactured, but the Bureau of Standards claims that only 178 types are needed to supply all needs. This is a reduction of 39 per cent in the number now being manufactured. About 120 hot water storage tanks of different dimensions and capacities are now being manufactured, whereas 14 are all that are needed; a reduction of 88 per cent in the number of types made.

So on, throughout the long list of consumer and processor commodities, the National Bureau of Standards points out the possible reductions in the numbers of sizes, weights, dimensions, styles, qualities, and varieties of products.

New Fuel Requires New Type Engine, Curtis Claims

Hartford, Conn.

**** "A fuel many times more powerful than gasoline has been produced, which will require entirely new automobile engines because present designs are not able to use it," Frank W. Curtis, past president of the American Society of Tool Engineers, told 400 members of the Hartford chapter at their annual meeting. This fuel is of a very high compression type that will require a small, high-speed motor with a greater power-per-pound of weight than existing motors. These engines will probably be used in large numbers in small planes that will be produced after the war.

The war efforts have resulted in the development of other processes and products that otherwise might have been delayed, Mr. Curtis claimed. After the war, it will be another problem for the tool engineer to make it possible for these discoveries to be applied and made available for public consumption. The country's tremendous capacity to produce aluminum and magnesium will be about expansion in the use of light metals,

and a similar situation exists with plastics.

"During the past few years," Mr. Curtis explained, "management has learned to realize that tool engineering is the backbone of successful manufacture." Tooling is recognized as vitally important and not just so much overhead, and should not be valued by its cost. Cost, while being a factor, is far less important than performance. More can be accomplished with highly

specialized tooling in an older type machine tool than through the use of a most modern and efficient machine with inadequate tooling.

The skill and ability of America's tool engineers which have made possible the rapid conversion of industry to war production will, in peace time, bring to America mass-produced consumer products in huge quantities and more economically than ever before known.



Shepard Niles Transfer Crane with Monorail Hoist—several departments are served with the one Monorail Hoist.

...TO ANY POINT IN THE PLANT OR YARD

Cab Operated Monorail Hoists carry loads of every description. They give through the air "Express Service," indoors or out to any point in the plant or yard, without rehandling. They are also ideally suited to the accurate control of single line, hook on and multiple line grab buckets.

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CRANE & HOIST CORP.
A COMPLETE LINE OF CRANES & HOISTS
356 SCHUYLER AVENUE • MONTOUR FALLS, N.Y.**



P R I O R I T I E S

WPB to Set Up Continuous Check of PRP Adherence

Washington

• • • The WPB Compliance Branch on July 1 began a continuous audit of records of some 9000 manufacturing companies operating under PRP, and the board said that it is expected that this number will at least be doubled as the result of priorities regulation No. 11. Under this regulation, June 30 was the deadline for the filing of PRP applications by all manufacturing users of metals in excess of \$5,000 worth per calendar quarter.

Cases of apparent violation of PRP regulations will be referred to field investigators, for further

Revisions for the Priorities Guide are shown on Page 133.

scrutiny of the circumstances. A company believed to be operating in contravention of WPB orders may be given opportunity to present its case to a regional compliance commissioner. Following such a hearing, the commissioner will forward the testimony to

MANUFACTURERS' FORM: This Rerating Certificate, PD-4-y, is used by the manufacturer whose deliveries to a war agency have been rerated, so that he in turn may rerate related deliveries to be made to him.

(THIS FORM MAY BE REPRODUCED)					
WAR PRODUCTION BOARD BUREAU OF PRIORITIES Washington, D.C.					
RERATING CERTIFICATE					
Issued to: _____ (Name of Supplier)					
Address: _____					
Pursuant to Priorities Regulation No. 12, deliveries to be made by you are rerated as follows:					
GOVERNMENT CONTRACT NUMBERS	OUR ORDER NO. OR OTHER IDENTIFICATION OF ITEMS RERATED	QUANTITY	NEW PREFERENCE RATING	ALLOCATION CLASSIFICATION & PURCHASERS' SYMBOL UNDER PRIORITIES REG. NO. 10	OTHER IDENTIFICATION REQUIRED ON GOVT. ORDERS
<small>The undersigned represents to the above-named Supplier and to the War Production Board that the above rerating is made in accordance with Priorities Regulation No. 12, with the terms of which he is familiar, and that the new ratings and quantities specified are correct.</small>					
<small>Date _____ Name of Purchasing Company _____ By _____ Signature and Title of duly authorized official _____</small>					
<small>NOTE TO SUPPLIER: Deliveries required by you in connection with making the above-specified deliveries to us may, in turn, be rerated by you to the extent and in the manner provided in Priorities Regulation No. 12. In filling out and furnishing to each of your suppliers a certificate in the same form as this Form PD-4-y, printed copies are not required. You may type the entire form or have blank copies of it printed or otherwise duplicated.</small>					
<small>Before furnishing such a certificate, you must become familiar with Priorities Regulation No. 12. Misuse of this certificate is a crime, punishable by fine or imprisonment.</small>					
<small>This certificate must be retained in YOUR files for examination by the War Production Board and you must likewise retain copies of certificates furnished by you to your suppliers.</small>					

Washington, together with his recommendations in the case.

In more serious instances of diversion of scarce materials, the investigators' reports may be referred directly to the Department of Justice for appropriate action. Since the signing by the President last March of the Second War Powers Bill, criminal prosecution may be instituted against priorities violators.

The audit will be directed from Washington by Joseph I. Lubin, deputy chief of WPB's Compliance Branch Investigating Section. Mr. Lubin is a member of the firm of Eisner & Lubin, certified public accountants, New York.

WPB's Compliance Branch has enlisted the aid of the field investigation staff of the Wage and Hour Division of the Department of Labor in its program. Field work will be directed by the eight regional compliance chiefs, and accountants' reports of audits will be reviewed by analysts on their staffs.



New Ratings for War Orders Established

• • • New AAA, AA-1, AA-2, etc., preference ratings, all of which will take preference over A-1-a ratings, have been set up for rerating war orders and for application, under priorities regulation No. 12 and amendments to regulations 1 and 3. Heretofore, AA has been the highest rating assigned, and used only by special authorization of the Director of Industry Operations. This rating is now abolished, and all outstanding AA ratings are automatically changed to AA-2.

The rerating was established to permit greater flexibility in the assignment of preference ratings to definite quantities of military and related non-military items, most of which have recently been either AA orders or high in the A-1 series. Top ratings now may be used for a balanced program of urgent war materials without seriously disturbing the pattern of ratings for other war and essential civilian orders.

The Director of Industry Operations or appropriate offices of government war agencies, duly

authorized, may assign the new ratings. A "Rerating Direction" on a special form, PD-4-x, is prescribed for use where the Army, Navy, or other government war agency rerates deliveries of war materials to be made directly to it. When a Rerating Direction is issued, it must include the "allocation classification symbol" and the "purchasers' symbol" required by regulation No. 10.

Form PD-4-y is a "Rerating Certificate," and is used by a manufacturer whose deliveries to a war agency have been rerated, so that he may in turn rerate related deliveries to be made to him. If an original rating may be applied or extended, as specified in priorities regulation No. 3 as amended to provide a uniform standard of ratings extensions, then the delivery may be rerated by a manufacturer or his suppliers.

A manufacturer or supplier may apply or extend the rerating to materials that will be delivered by him on a rerated order or physically incorporated into material so delivered, or to restore inventories to a practical working minimum when material has been taken from inventory to fill a rerated order. The new ratings may be used by small companies for certain operating supplies which will be consumed in filling the rated order, up to 10 per cent of the cost of materials to be processed, provided that not more than 25 per cent of such operating supplies are metals in the forms listed in priorities regulation No. 11. Such rerating may not be used to obtain operating supplies by any company whose use of metals listed in regulation No. 11 totals more than \$5000 a calendar quarter. Such companies obtain ratings for their operating supplies under the PRP.

Companies under PRP may apply or extend higher ratings to re-rate deliveries to themselves, but may not use the ratings to obtain greater quantities of materials than authorized to receive on their PRP certificate, PD-25-a, or the supplementary certificate issued on application on forms PD-25-f or PD-25-h.

Under priorities regulation No. 1, no producer was required to divert material already processed to fill an order rated A-10 or higher which was within 15 days of completion, even when he received a new order with a higher

How To Operate Under PRP

• • • In answer to requests from industry for information about PRP—the Production Requirements Plan—THE IRON AGE has issued a special 12-page PRP supplement to the latest edition of THE IRON AGE Priorities Guide.

In the 12-page PRP supplement is the information listed in the following table of contents:

Purpose of PRP and General Instructions.

Allocation Classification Symbols.

Specific Instructions on Allocation Classification.

Alphabetical List of Products and Industries, Showing What Symbols to Place on Orders for Materials.

How to apply and Extend Preference Ratings Under PRP.

The 36-page Priorities Guide, Sixth Edition, includes additional priorities data shown below:

Index to Material and Equipment Orders.

Directory of WPB.
Material Conservation "M" Orders.

General Preference Rating "P" Orders.

Production Limitation "L" Orders.

Priority Order "PD" forms.
PD Forms that do not have to be filed.

Relief from "M" and "L" Orders.

Machine Tool Preference Rating "E" Orders.

Priorities Regulations.

Miscellaneous Orders.

Metalworking Price Ceilings.

Prices for extra copies of the 36-page Priorities Guide with the PRP supplement included: One to 10 copies, 50c. each; 11 to 100 copies, 40c. each; 101 to 300 copies, 35c. each; and 300 or more copies, 30c. each. (Cash or stamps, please, for orders of \$2 or less.) Send your orders to THE IRON AGE, 100 East 42nd Street, New York.

rating, unless the new rating was AA. Hereafter, this provision applies only in case the rating on the original order was higher than A-2. Such an order within 15 days of completion must be displaced only by a new order with an AAA rating, or by specific direction from the WPB.

Regulation No. 3 is amended to conform to the provisions of regulation No. 12 and the amendments to regulation No. 1. The amendment to No. 3 also modifies the previous provision with respect to

simultaneous extension of several different ratings. Whereas, previously, a company having several different ratings to be extended to orders for the same material could put them all together and write one purchase order for the entire quantity, using the lowest rating for the entire order, this will now be permitted only when it is not commercially practicable to rate and obtain the items separately.



PRP Change Defines Use of Ratings, Clarifies Order

Washington

• • • Procedure to be followed by companies which have not yet received a PRP certificate was clarified and the permissible use of ratings by companies already operating under that plan were outlined in an amendment to Priorities Regulation No. 11.

The regulation, as originally issued, permitted companies who had filed PRP applications before July 1 but had not yet received the PRP certificates to receive deliveries and apply preference ratings within certain limitations. The amendment omits the specific date, and makes this procedure available to any company which is not in default in filing its application, so as to permit placing purchase orders at any time before the deadline for filing the PRP applications, which may in certain cases be extended beyond June 30.

Another section of the amendment allows companies which have been operating under the PRP during the second quarter of 1942 to accept delivery of materials rated on their second quarter PRP certificate during the third quarter if such delivery has been delayed. The material authorized by third quarter certificate is in addition to this allocation.

Meanwhile, WPB announced that special reports on Form PD-25-g will not be required from companies operating under PRP after the June report. This form has been used for monthly reports of extensions of AA ratings and ratings for "as required" items by companies using PRP.

Under the terms of Priorities Regulation No. 11, issued June 10, no company which obtains priority assistance under PRP may

P R I O R I T I E S

apply or extend any other preference ratings after July 1. This eliminates the permission previously granted to extend AA ratings and ratings for "as required" items. The use of Form PD-25-g will, therefore, no longer be necessary after the report for the month of June.



Vanadium Melting

• • • Complete control of melting and delivery of vanadium in

amounts of 10 lb. was assumed by the WPB in an amendment to order M-23-a. While vanadium has been under allocation control for nearly a year, nothing heretofore has restricted melting of vanadium. This new amendment prohibits melting of any present or future stocks except by specific authorization of the WPB, or unless the melter's schedule has been approved as provided in the iron and steel alloy order, M-21-a. Requests for allocation must be filed monthly by the 20th or the preced-

ing month on forms PD-209-a and PD-209-b, and buyers must also file PD-209-b with their suppliers. Deliveries to a total of 10 lb. in any one month are exempted from this reporting provision. The original order permitted the delivery of 50 lb. per month without restriction.



Coke Stocks

• • • Producers of chemicals are permitted to build up inventories of coal and coke by amendment No. 2 to order P-89. This amendment is taken as part of the drive to encourage the accumulation of fuel stocks in anticipation of shortages expected next winter by war demands on transportation facilities. The amendment also extends the order and all amendments until revoked. The change permits the acceptance or delivery of any amount of coal or coke even though such delivery may be in conflict with other WPB orders, including priority regulation No. 1.



M-126 Changes

• • • Changes in the steel conservation order, M-126, were made to permit maintenance and repair of coffee roasting machinery and the manufacture of tags or badges for specified uses. A third change eliminates manicure implements from List A of the order, as their manufacture is covered by order L-140.



Copper and Brass

Washington

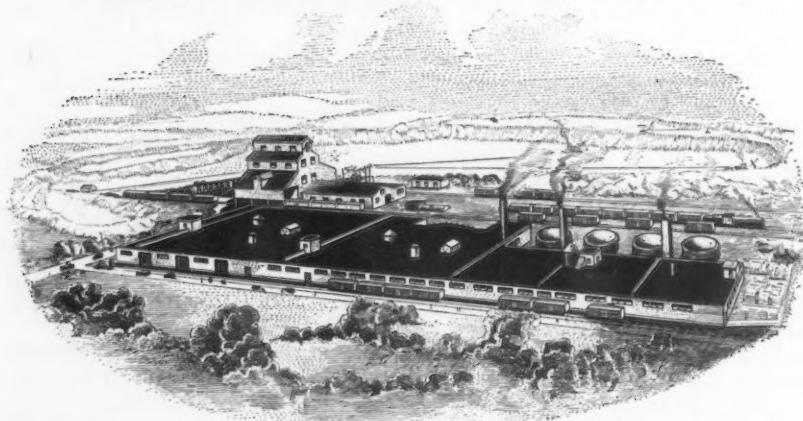
• • • An amendment to conservation order M-9-c, eased restrictions governing the use of copper and brass in certain civilian products. Permission was granted to attach and use zippers, snappers, fasteners and other copper and brass clothing findings already manufactured, but none may be manufactured.

Other effects of the amendment are: (1) musical instruments are added to the list of products not covered by this order because they are covered by L-37-a. (2) watches and clocks may be assembled from parts completed prior to June 15, into cases not containing brass or copper. (3) the prohibition on use of copper and brass in manu-



GOOSE LAKE

*Fire Clay and
Fire Clay Flour
Fire Clay Brick
Therm-O-Flake Insulation*



Goose Lake Clay Deposit with Clay Grinding and Fire Brick Plant



JOLIET, ILL.

P R I O R I T I E S

facture of bells is lifted, under certain circumstances, to permit such use for conduction electricity, and, (4) the prohibition on use of copper or brass in radio manufacture is lifted to permit manufacture of replacement vacuum tubes and various special types of radio apparatus under certain circumstances.



Cannery Repairs

Washington

• • • Affecting some 3000 canneries whose 1942 pack is expected to exceed that of 1941 by about 15 per cent, a WPB amendment to preference rating order P-115, raises to A-1-j from A-3, the rating on materials for repair, maintenance, and operation for plants of fruit and vegetable packers.

The rating for materials for replacement, additions, and expansion was raised to A-1-c from A-3.



Safety Razors

• • • WPB announced that it had extended until July 31, order L-72, which governs the production of razors and blades. Safety razors will continue to be produced at 70 per cent of the rate of production in 1940, and razor blades and straight razors will be manufactured at 100 per cent of their 1940 rate of production. No copper may be used in razors except for plating. It is expected, WPB said, that safety razors will shortly be made of plastics.



Truck Trailers

• • • A halt to production of commercial-type truck trailers for non-military use has been ordered effective July 1. No manufacturer will be permitted to produce any truck trailers having a load-carrying capacity of 10,000 lb. or more except for the Army, Navy, designated government agencies, United Nations, and for deliveries under Lend-Lease. Restrictions do not apply to third axle attachments, which have performed valuable services as substitutes in relieving the shortage of heavy trucks

by increasing the load capacity of existing equipment. The stop-production order is contained in order L-1-g, which also removes buses from the terms of the order in the L-1 series, placing them under order L-101, which was issued May 21.



Cleaning Machinery

• • • A re-issue of order L-91, amended to June 22, controls the

production and distribution of laundry and dry cleaning equipment and tailor's pressing machinery. The new version embodies the terms of previous amendments and the order itself, and makes certain additional changes. Distributors and manufacturers must file monthly reports of orders, production, and shipments on form PD-419. Also, the addition to the list of deliveries authorized by the regulation of shipments to fill orders for



for Blackening Steel Parts

• A Michigan metal parts manufacturer urgently needing a tank for blackening steel, showed its ingenuity by building the tank shown above from 56 pieces of scrap steel collected around the plant. Today this tank is turning out thousands of blackened parts on a production basis, using this single-bath treatment.

HOUGHTO-BLACK is a low temperature blackening solution which is rapid, economical and provides a durable, attractive and protective finish to metal parts without altering dimensional sizes. Operating at 290-295° F., with pre-clean and hot and cold rinses, this process is now being used for a myriad of applications.

It will pay you to investigate HOUGHTO-BLACK! Ask the Houghton Man, or write for factual folder at right.

E. F. HOUGHTON & CO.
PHILADELPHIA

Chicago • San Francisco • Detroit



HOUGHTO-BLACK

P R I O R I T I E S

bag-loading or other ordnance plants where the hazard is such that the machinery has been specified as necessary by the Army or Navy. Vessels built for the Navy are also entitled to receive equipment controlled by L-91.



Builders' Supplies

• • • A large group of slow-moving, non-critical building supplies

is released from restrictions imposed by order L-63 under the terms of exemption No. 5. Dealers holding stocks of Portland and natural cement, lime, Gypsum and Gypsum products, bituminous roofing materials, concrete pipe, cut stone, sand and gravel, crushed stone, clay productions, insulation board, acoustical materials, mineral wool, paving materials, concrete products, glass, lumber, and wooden mill work

need no longer include them in the records and reports called for by L-63, although they remain subject to the inventory restrictions of priorities regulation No. 1.



L-26 Changes

Washington

• • • Announcement was made by WPB of an amendment to order L-26, authorizing a substantial increase in the output of wooden beehives, but that production of metal hives is still subject to the original order. Another provision of the amendment permits the production of belt-driven but not electric irrigation turbine pumps of 1200 gal. per min. capacity and larger in sufficient quantities to fill orders rated A-3 or better. Previously, production of any turbine pumps of these sizes was prohibited.



Chrome Chemicals

• • • Revisions to orders M-18-b, which covers various uses of chrome chemicals, and M-53, which relates to the use of chrome pigments in printing inks, were eased somewhat. M-18-b lifts the restriction on the manufacture of chrome pigments from 90 per cent of the base period to 100 per cent. Use of chrome chemicals in ceramics, soap, and glass, heretofore prohibited, is limited to 100 per cent of the base period. In roofing materials, also prohibited by the original order, 50 per cent of the base period use may be consumed. For leather tanning, the restriction is upped from 90 to 100 per cent. M-53 permits the use of chrome pigments in printing inks of 100 per cent of the amount used in 1941, instead of 70 per cent and makes other changes in the order.

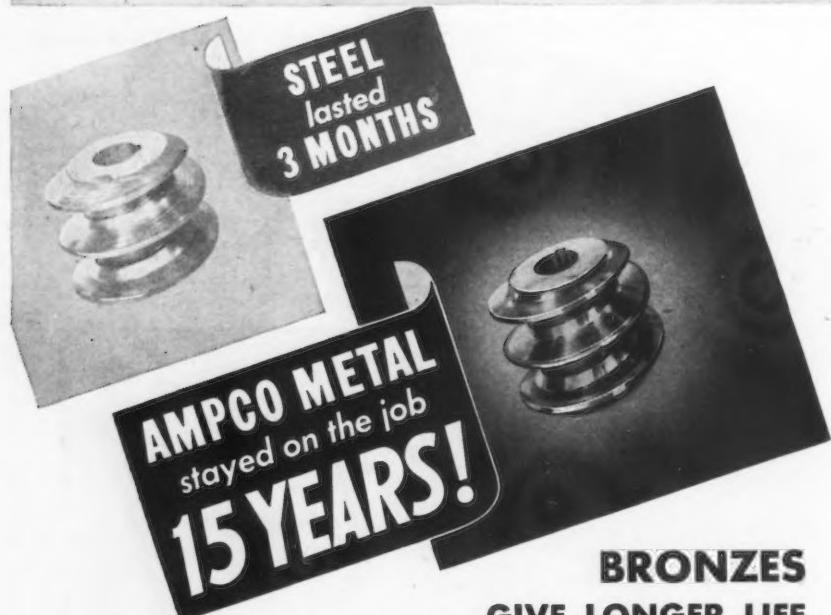


Tinplate and Terneplate

• • • Tin and terneplate cans for many chemicals, paints, and other "special products" was prohibited after June 27, 1942, in a revision of order M-81. Among the special products included are all paint and related products, except shel-

(PLEASE TURN TO PAGE 131)

A M P C O C A S E H I S T O R I E S



Once the maintenance crew replaced the steel worm on a coal dock installation every three months. Grit, abrasion, hard usage, resulted in limited life. Then the company installed a worm made of Grade 18 Ampco Metal, that unusual bronze alloy. It served satisfactorily for 15 years!

An exceptional instance, of course, but indicative of Ampco Metal's ability to give long life and excellent service in out-of-the-ordinary applications.

If parts in your equipment give away through fatigue and wear, replace with Ampco Metal. Test it in active performance and see for yourself its ability to "take it."

Send for literature describing Ampco alloys. We produce bronzes to government specifications.

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DEPARTMENT IA-7

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TRANSPORTATION NEWS

Overseas Freight Has Not Blocked U.S. Ports, Eastman, of ODT, Says

• • • Overseas freight stored at ports and elsewhere is not being stored to any important extent in cars and so is not interfering with the domestic movement of freight, Joseph B. Eastman, director of the Office of Defense Transportation reports.

"You may have seen statements that there are large accumulations of overseas freight at or on the lines leading to the ports, creating the impression that the ports are blocked," Mr. Eastman declared, last week, in an address at New York. "They are not blocked out but are in liquid condition. There are no present accumulations of cars at the ports which are in any way alarming.

"From the beginning it has been known that it would be necessary to store in this country great quantities of war products, for longer or shorter periods, not only to maintain adequate reserves but until deficiencies in overseas shipping could be overcome. In the executive order which created the Office of Defense Transportation, it was made my duty to 'survey and ascertain present and anticipated storage and warehousing requirements at points of transfer and in terminal areas; and encourage the provision of increased storage, loading, and unloading facilities where necessary.' That duty is being performed. Freight cars must not be used for storage, and they will not be.

"Storage depots of large capacity have been and are being constructed by the Army; much ground storage made available by the railroads is being used; the storage and warehousing industry of the country has been well organized to give effective aid. You need not be alarmed when you see war products in storage. It does not mean that our transportation system has broken down," the ODT chief said.



Export Freight Movement

• • • A general order making it possible to remove from the United States ports any freight cargo when necessary to assure

expeditious movement of troops and war materials was issued by the ODT. The order, general order No. 12, effective immediately, authorizes the ODT to require any railroad serving a port to move to such destination as the ODT may specify, "any export, coastwise, or intercoastal shipment of freight which it may have in its possession in such port, notwithstanding the provisions of any general order heretofore is-

sued by ODT or of any instructions contained or routing specified in the bill of lading of any such shipment."

The order makes it possible to relieve certain ports of cargoes on hand, or in storage, many of which were destined for foreign ports at about the time of enemy occupation of these ports. Issuance of the order does not imply the existence of any serious port congestion, but that certain of

METAL LOSSES LESS THAN $\frac{1}{2}$ OF 1% IN THIS EFFICIENT, SPEEDY FURNACE

"On our copper alloy our metal loss averages less than $\frac{1}{2}$ of one per cent," writes one user of a Detroit Rocking Electric Furnace. Says another, "We found consistently that the loss during melting is between 4/10 and 5/10 of one per cent."

Users of Detroit Furnaces the country over report similarly low metal losses. And in these days when every scrap of most metals is a vital factor in our war effort, these metal savings which a Detroit Furnace makes possible are well worth while.

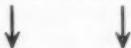
Detroit Furnaces for melting either ferrous or non-ferrous metals and alloys are available in nine sizes with rated capacities from 10 to 8,000 pounds. Write today for further facts about the remarkably efficient, high speed Detroit Rocking Electric Furnace.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

TRANSPORTATION NEWS

this so-called "frustrated" freight occupies cars, ground, and warehouse space while it awaits final disposition. The order simply makes it possible to remove this freight to assure peak capacity of actively-moving commodities.



Military Transport

• • • A plan for the organization of motor transport units in vari-

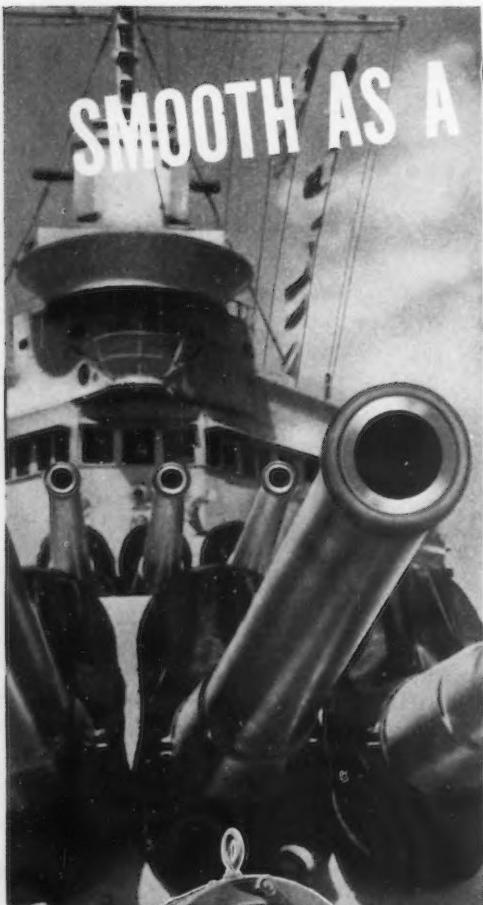
ous parts of the country to facilitate the movement of troops and civilians in event of emergency was announced by the Office of Civilian Defense and the Office of Defense Transportation. The aid of large transportation companies has been solicited. Each unit would consist of 24 trucks or buses capable of transporting 40 passengers each. Depending upon local conditions, each unit also may include a 5-passenger auto-

mobile, a service truck, a tank truck, and a light pick-up truck.



Mass Transportation

• • • The extent to which bus and street car companies cooperate with the war transportation program of ODT will determine largely whether regulatory measures will be necessary, ODT stated. Public transportation efficiency must be increased on a voluntary basis, or such measures will be required. Operations will be called upon in the near future to advise ODT as to the progress that has been made toward more efficient use of mass transportation facilities. The showing which the various industries make will determine to what extent further compulsory action is necessary.

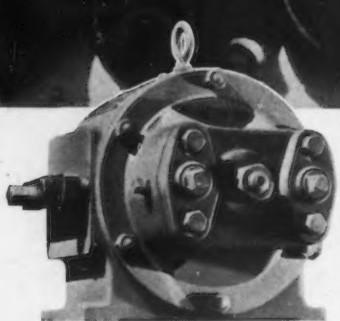


SMOOTH AS A GUN BARREL

Hele-Shaw Fluid Power
smoothness reduces vibration,
cushions shock, makes
machines last longer

Smoothness—that's one advantage of Hele-Shaw Fluid Power we can get across in few words. You see, Hele-Shaw Fluid Power is simply oil under pressure from a Hele-Shaw pump. It's used to power hundreds of different types of hydraulically driven machines. The Hele-Shaw pump is a rotary, radial, multi-plungered pump. The power it delivers flows smoothly to the driven ram or plunger. Then, too, using oil, the pump and the system, are self lubricated. The oil also serves to cushion the driven machine or machine-tool against shock. Fluid Power reduces vibration, absorbs shocks, lengthens life of machine, cuts manufacturing time and maintenance. Look up this and other advantages of Fluid Power in the Hele-Shaw Pump Catalog, yours for the asking.

Official U. S. Navy
Photograph



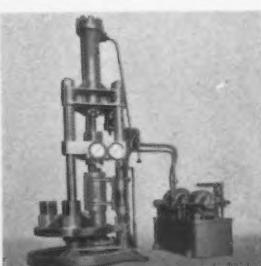
THE Hele-Shaw Fluid Power Pump

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, LO-HED HOISTS



AMERICAN ENGINEERING COMPANY

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Cross sectional view of the Hele-Shaw Pump showing the multiplicity of plungers responsible for the smooth even flow of Hele-Shaw Fluid Power.
HYDROSTATIC SHELL TESTING PRESS, built by the Baldwin Southwark Division, Baldwin Locomotive Works, Philadelphia. A feature is the individual Hele-Shaw pumping unit, permitting easy relocation of machine.

Savage Tool to Make Gage Blocks in New Plant

• • • In line with government policy of decentralization of industry, the Savage Tool Co., formerly of Minneapolis, has removed its plant to Savage, Minn. The new structure includes a modern engineering department, offices, cafeteria and an unobstructed factory space of 80 by 200 ft. The plant also has a completely equipped metallurgical laboratory.

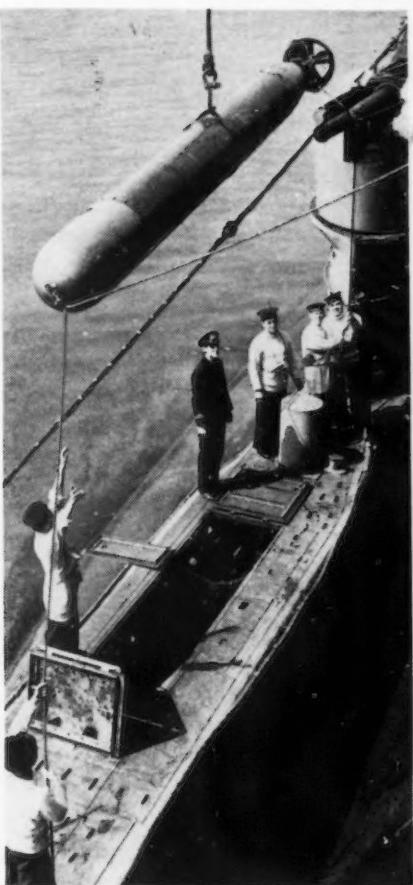
For the past two years, the company has produced the Doall precision surface grinder. Savage Tool will soon announce to the trade a line of precision gage blocks. For this production a gage department has been set up, with an air-lock entrance, double glazing and an air conditioning system to keep the temperature within 1 deg. of 68 deg. F., the temperature at which all gage blocks are compared.

Federal Shipbuilding Has Two Double Launchings in 8 Days

Kearney, N. J.

• • • The second double launching in eight days took place here June 28, when the cargo carriers *Santa Cecilia* and *Santa Margarita* were sent down the ways of the Federal Shipbuilding and Dry Dock Co., U. S. Steel subsidiary. Two destroyers were launched June 21 and a cargo ship the previous week.

NEWS OF INDUSTRY



THE SUB'S STINGER: These British tars are loading a torpedo into their sub at an unknown port. Censors obliterated the craft identifications and details of gun emplacements on the turret.

Steel Industry in India Growing Rapidly Due to War London

• • • Industrialization is at last making real progress in India, according to the financial editor of the Manchester Guardian, and the Indian steel output is increasing rapidly due to British war needs. About 20,000 tons of finished steel were produced in 1913 and 124,000 tons in 1918 and 1919. Before the present war, in 1938 and 1939, output was nearly 1,000,000 tons; the present rate is believed to be about 1,500,000 tons; and when expansions now underway are completed, India will be producing 2,000,000 tons of finished steel a year.

The Indian plants are producing a large variety of special steels, including alloy steel for aircraft, a high-speed steel (prob-

ably a tungsten type), nickel steel plates, and acid open hearth steel. It is likely that, before long, India will be entirely independent except for a few specialities, insofar as steel needs are concerned.

The engineering industry in India has also made great progress, according to the London source. More than 1500 workshops are now producing munitions, among which is the Bren gun. Airframes are being made

and the aircraft assembled, although India produces no aircraft engines. A new motor assembly plant has been set up by Americans to supply Russia with cars and trucks.

For the first time, some simpler types of machine tools and machinery are being made in India, and a great variety of railroad needs, including broad gage locomotives, are being made in the country.

CLOSE CONTROL to give you Better Springs Quicker!

CAREFUL, constant, supervision of every detail of production plus painstaking inspection of every order assures you of the fastest possible delivery of Accurate Springs . . . with no compromise in quality and accuracy.

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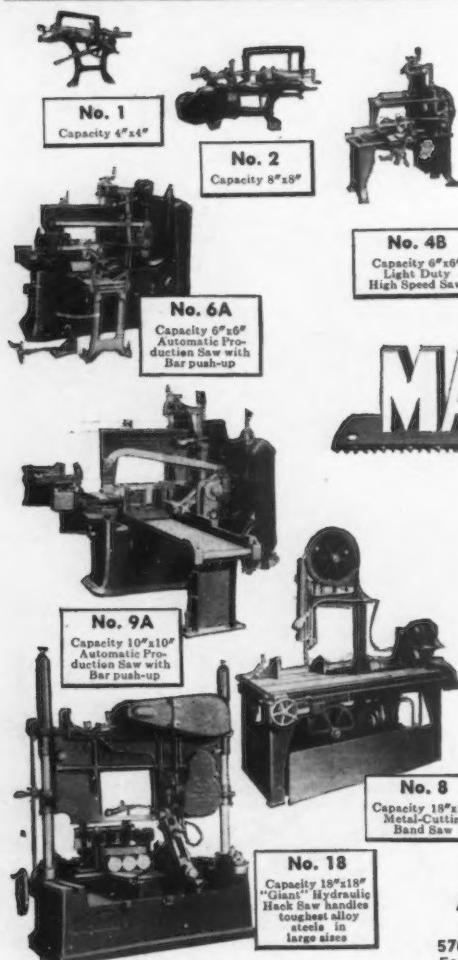
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First
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Equipment

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The Marvel System of Metal Sawing provides the most complete line of sawing machines built, including: the most widely used small shop saws (80% are MARVELS); the fastest high speed hack saws built, the most productive saws built (with automatic bar push-ups) the most versatile metal cutting saw—a universal metal-cutting band saw; a Giant hydraulic hack saw that handles the largest and toughest bars and billets with ease; and the positively unbreakable MARVEL High-Speed-Edge Hack Saw Blades that permit any sawing machine to operate safely and continuously at full capacity.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Avenue Chicago, U.S.A.
Eastern Sales Office: 225 Lafayette St., New York City

New Restrictions July 15 On Drums and Containers

Washington

• • • The Board of Economic Warfare will apply further restrictions in exports of filled and unfilled metal drums and containers, effective July 15.

Under these additional controls metal drums and containers with 10 gal. or less, when filled with commodities authorized for export may be shipped to all destinations under general license, provided the drums and containers are of a type reasonably suited for exportation of such commodities. Exportation of metal drums and containers exceeding 10 gal. must be authorized by individual export licenses, except that shipments may be made under general license to Canada, Great Britain and Northern Ireland, Newfoundland, Greenland, Iceland and the U. S. S. R.

The Office of Exports has suggested that license applications bear a statement to the effect that metal drums, containers or gas cylinders be returned promptly to the United States as soon as emptied, if the consignee has agreed to their return.

Warehouses, Hospital and Air Corps Jobs Approved

• • • The War Department announced June 26:

1. Award of a contract to the Baruche Corp., 625 South Olive Street, Los Angeles, for construction services, in connection with a depot warehouse in California, to cost in excess of \$3,000,000. Construction incident to this project will be supervised by the Los Angeles district office of the Corps of Engineers.

2. Authorization for the construction of a general hospital at Santa Fe, New Mexico, to cost in excess of \$3,000,000. Construction will be supervised by the Albuquerque district office of the Corps of Engineers.

3. Authorization for the construction of an air force training school at Victoria, Texas, to cost in excess of \$3,000,000. Construction will be supervised by the Galveston district office of the Corps of Engineers.

4. Award of a contract to Austin Co. for architectural - construction - management services, in connection with an air corps installation in Illinois, to cost in excess of \$3,000,000. Construction will be supervised by the Chicago district office of the Corps of Engineers.

5. Authorization for the construction of an air force training school at Clarksville, Tenn., to cost in excess of \$3,000,000. Construction will be supervised by the Nashville district office of the Corps of Engineers. In connection with this project, a fixed fee contract has been awarded Allen and Hoshal, Walk C. Jones and Walk C. Jones, Jr., joint venturers, Memphis, for architectural-engineering services.

6. Award of a contract to the Tennessee Eastman Corp. of Kingsport, Tenn., for the operation of a manufacturing plant in Tennessee, to cost in excess of \$3,000,000. Construction incident to this project will be supervised by the Kingsport district office of the Corps of Engineers.

Construction in connection with the military installation at Shenango, Pa., will be supervised by the Pittsburgh district office of the Corps of Engineers, and not by the Chicago district office.

F INDUSTRY

Work Starts on New Plant For Aircraft Engine Castings *Cleveland*

• • • Construction of the new government financed National Aluminum Cylinder Head Co., subsidiary of National Bronze & Aluminum Foundry Co., was started early Wednesday morning, June 24, with a ground-breaking ceremony. Cleveland's mayor, Frank J. Lausche, operated the controls of the steam shovel moving the first load of dirt. Dennis Hall, district supervising engineer of Defense Plant Corp.; L. R. Zee-man, supervising engineer of Defense Plant Corp., and John J. Schmeller, executive vice-president of National Bronze & Aluminum Foundry Co. rode in the steam shovel cab.

The war plant is sponsored by the War Production Board and sanctioned by the Defense Plant Corporation. Upon its completion early next year, it will produce aluminum castings for aircraft engines. It will be on the site of the plant which was almost totally destroyed by a \$2,250,000 fire last September. Rehabilitation efforts were so swift, however, that the company resumed pouring castings six days after the fire. New plant units were erected and the factory now houses a training school for foundry workers

May Structural Steel Bookings 192,822 Tons

• • • New orders for fabricated structural steel booked during May amounted to 192,822 tons, according to reports received by the American Institute of Steel Construction. This was a volume about equal to the average of the bookings of the industry during the twelve months of 1941. The shipments of fabricated structural steel during May were equal to the average of the monthly shipments made so far this year. Both bookings and shipments, to date, are in slightly larger volume than for the same period of last year.

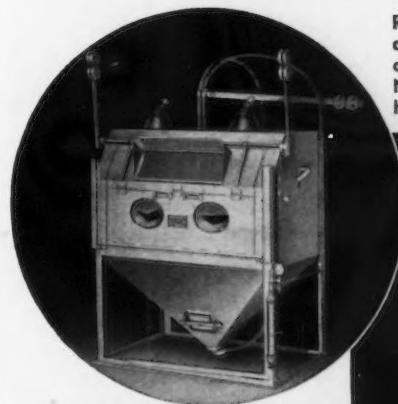
It was necessary to revise downward by a little more than 17,000 tons the estimate of contracts closed during April due to the change in structural plans called for by the War Production Board when further restrictions were placed on construction.

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ALL SHAPES • ALL SIZES • ALL MATERIALS

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RECOMMENDED FOR:

1. Heat treating plant—removing scale, oxides.
2. Aircraft production—cleaning welds, metal preparation.
3. Foundries, ferrous and non-ferrous — cleaning castings.

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Ruemelin cabinet with door open. Provides quick access for loading and unloading.

RUEMELIN Blast Cleaning Cabinets

NEWS OF INDUSTRY

Inland Chairman,

Philip Block, Dies

Chicago

• • • Philip D. Block, last surviving founder of the Inland Steel Co., died Tuesday morning in Chicago. Mr. Block was chairman of the executive committee of Inland at the time of his death, having previously served as president for 22 years.

With his father, Joseph Block, and the late George H. Jones, Mr. Block was one of the principal



PHILIP D. BLOCK

factors in the founding of Inland 49 years ago. It was Mr. Block who made an efficient plant of the original works at Chicago Heights, Ill. In 1901 he was the driving force behind the opening of the company's plant at Indiana Harbor, Ind. It was largely through his untiring efforts, ably assisted by his brother, L. E. Block, that Inland rose from such a modest beginning to one of the large steel companies of today.

Mr. Block was a director of the First National Bank of Chicago, but had few other business interests, devoting his full time to the development of Inland. He was member of several clubs.

He was born in Cincinnati, Feb. 16, 1871.

**Kearny Shipyard Dims Out
But Work Goes On All Night**
Kearney, N. J.

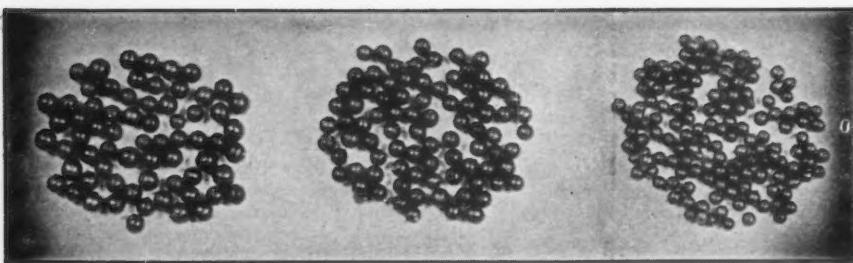
• • • Sky glow is being dimmed to the utmost that will still permit night production of ships at the Federal Shipbuilding and Dry Dock Co.

TOLERANCE-
a vital figure in
spring performance

It pays to analyze your spring tolerance requirements in the light of exact needs. You'll help your springmaker and yourself by being specific. If your spring design is tough—requiring close tolerances, Dunbar's is the place to get them. If, on the other hand, tolerances are easy, and mass production your desire—Dunbar's also is the place to go.

The spring you need is the spring that does the work—no more, no less. Let your springmaker help you to get it. Let your springmaker be

Dunbar Bros. Co.
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
"Quality Springs Since 1845"



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

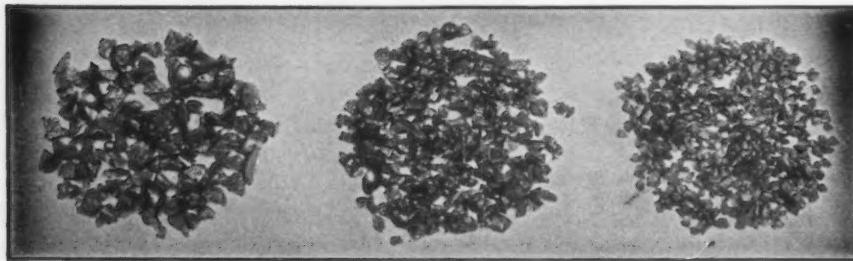
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



P R I O R I T I E S

(CONTINUED FROM PAGE 124)

lac, lacquers, varnish removers, lacquer thinners and stains which may use terneplate but not tinplate cans; health supplies, except chloroform, ether, and blood plasma for the armed services and Red Cross; alcohol, cements, fly spray, lighter fluids, acetone, amyl acetate, oleic acid, sodium silicate, dry cleaners, turpentine, phenols and benzols, glycerine, dyes, graphite, liquid soap, glues and paste, waxes, and polish. The revision also prohibits packing after Oct. 31, the following products in tinplate or terneplate: Hardened edible oils, lard, edible liquid oils, fish fillets, crab meat, and shrimp. A number of minor changes in other provisions relating to food packing are included in the revised order.



Hand Files

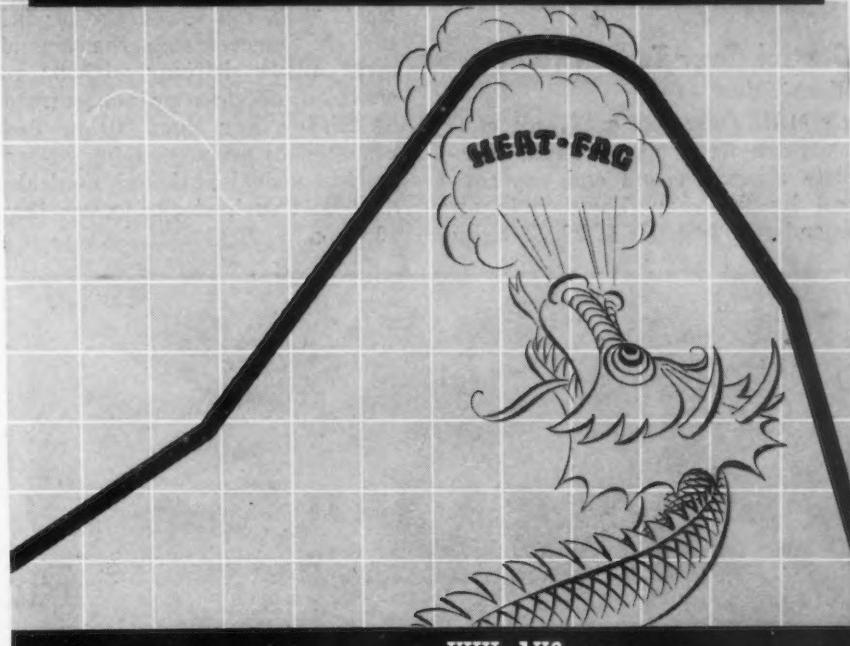
• • • WPB added industrial hand files to the list of hand service tools covered in the provisions of general preference order E-6, which limits the type of steel which may be used in producing such tools and also limits the orders which producers may fill.



Plastics

• • • Control of the distribution of thermoplastics under order M-154 was set up by WPB. The order sets up a "ladder of uses" to govern the distribution of all types of thermoplastics to all users. Civilian uses are divided into four classes and war orders are to be filled first without restrictions. Each order must be accompanied by a certification from the person seeking delivery that (1) he is not building up inventory, (2) his total deliveries accepted during the month in question will not exceed 1/12 of his consumption for the year ending Dec. 31, 1941, (3) the end use set forth, together with its classification, will not be violated, and (4) the resulting scrap will be used in conformance with the order. Thermoplastics made entirely from scrap may be used to fill Class III orders without restriction, provided the scrap quality is not sufficient to permit use in

ACCIDENT AND HEAT EXHAUSTION RECORD!



JAN • FEB • MAR • APR • MAY • JUNE • JULY • AUG • SEPT • OCT • NOV • DEC

"I Do This Every Year!" Accident-conscious men of industry look anxiously to the hot months — months when men sweat most — when ever-lurking Heat-Fag takes its heavy toll. It is a fact that as the heat curve goes up, so does the accident rate. For, workers who sweat lose body salt. Unless it is replaced — fatigue sets in. Vitality is sapped — men become inalert . . . and that's when accidents happen . . . and when man-hours are lost. For, Heat-Fag and accidents ride together!



AVOID HEAT-FAG... USE
MORTON'S
SALT TABLETS



QUICK DISSOLVING (less than 30 seconds)

This is how a Morton Salt Tablet looks when magnified. Examine one — see how soft and porous it is inside. When swallowed whole — with a drink of water, they dissolve in less than 30 seconds.

Wherever workers sweat, Salt Tablets are needed, for they represent the simple, easy way to replace salt that's lost through sweating and hot work.

Case of 9000 10-grain \$2.60
salt tablets,

Salt-Dextrose Tablets, case of 9000 \$3.15

Order from your distributor — or directly from this advertisement.

Place MORTON'S
DISPENSERS at all
Drinking Fountains
They deliver salt
tablets, one at a time,
quickly, cleanly —
without waste. Sanitary,
easily filled,
durable. 500-tablet
size, \$3.25. 1000-
tablet size \$4.00

MORTON SALT CO., Chicago, Ill.

EVERYONE WHO SWEATS NEEDS SALT



FREE Sample Tube
Write on your firm
letterhead — for a
pocket size sample
tube of Morton's Salt
Tablets and for the
new folder — "Heat
Fag and Accidents
Ride Together."



P R I O R I T I E S

Class I and II articles. Such scrap must be limited to 15 per cent of a producer's output.

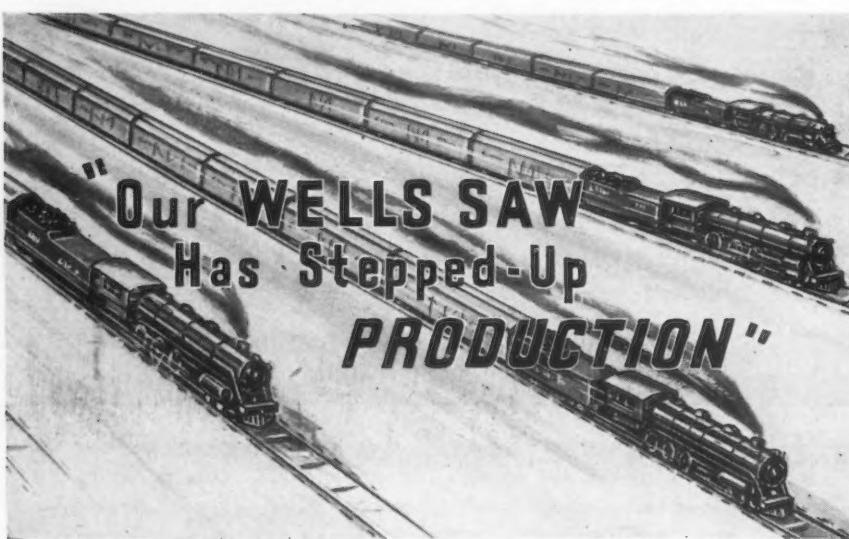
Control Over Tungsten Ore

Washington

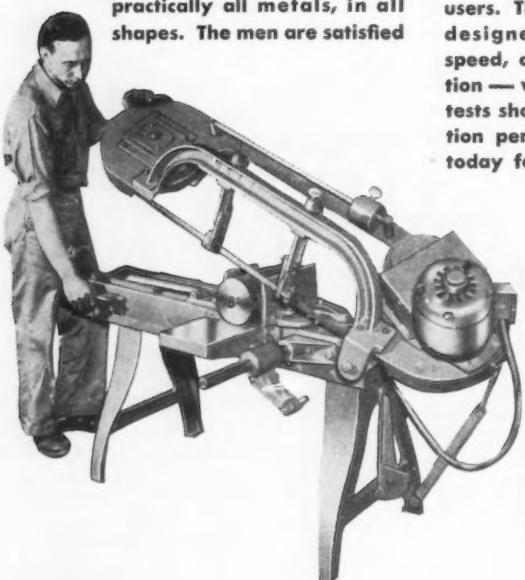
• • • All tungsten ores and concentrates were placed under complete allocation and end use control by WPB on Tuesday in an amendment to order M-29. If more

than 25 lb. of tungsten are delivered to any one processor in any one month the terms of the order apply. Previously the maximum was 100 lb. To encourage production of concentrates the amendment allows delivery without restriction of ores or concentrates containing less than 20 per cent tungsten to processors for concentration or dealers though no dealer may hold such stocks longer than 60 days.

Persons desiring allocations must apply on form PD-9-c before the 20th of the month preceding delivery.



"Since installing the Wells Metal Cutting Band Saw our records show increased production. It quickly cuts practically all metals, in all shapes. The men are satisfied



— and I'm satisfied enough to order another."

That's the talk we hear from Wells users. This fast, sturdy, metal cutter, designed for today's productive speed, operates with minimum friction — without coolants. Long run tests show less than .005 inch variation per hundred samples. Write today for full information.

Wells SAWS
THE SIGN OF SERVICE

S P E C I F I C A T I O N S

WELLS No. 8
Capacity: Rectangle 8" x 16"
(spec. bowed guides) 5" x 24"
Rounds 8" dia.
Speeds ft. per min. 60, 90, 130
Motor Specifications optional

WELLS No. 5
Capacity Rectangle 5" x 10"
(spec. bowed guides) 5" dia.
Rounds 5" dia.
Speeds ft. per min. 60, 90, 130
Motor Specifications optional

WELLS MANUFACTURING CORPORATION • Three Rivers, Michigan

A large stock of blades is available at all times

**WELLS METAL CUTTING
BAND SAWS**

Washington

• • • The provisions of Priorities Regulation No. 11 which requires companies operating under the PRP plan to cancel duplicating orders as soon as they receive the third quarter PRP certificates was emphasized on Tuesday in a statement by J. S. Knowlson, WPB director of industry operations.

Clarification Issued

Washington

• • • Smelters and refiners of metal which use more than \$5000 worth of metal in a quarter for maintenance, repair, operating supplies, and for processing into forms not listed in the metals list of Priorities Regulations No. 11 are required to apply for priority assistance under PRP, it was explained.

In determining whether or not it must apply under PRP, a smelter or refiner may exclude from consideration all metals which it processes only into forms described on the metals list, such as ingots, bars, wire, castings, etc. However, if the amount of metal processed into any unlisted form, plus metal used for maintenance, repair and operating supplies, amounts to more than \$5000 in a quarter, the smelter or refiner must apply under PRP for all such metal.

Cobalt Order Extended

Washington

• • • The cobalt allocation order, M-39, due to expire June 30, was extended indefinitely by WPB on Tuesday.

Drum Makers Aided

Washington

• • • To enable steel drum manufacturers to use some 150,000 gal. of exterior drum coating which they have on hand, the use of which was forbidden by conservation order M-158, an amendment to the order has been issued by the director of industry operations.

This Week's Priorities And Prices

PRP surveys of records of manufacturers started July 1, and will be a continuous audit of this part of American industry. (WPB1409)

Drum coating order M-158 was amended June 27 to permit use of stocks of coating now on hand. (WPB-1420)

Tinplate order M-81 was amended June 27 to prohibit use of tin and terne plate for canning certain chemicals and paints. (WPB1421)

Thermoplastics were placed under distribution control June 26 by order M-154. (WPB1422)

Rerating of war orders was made possible by the issuance of Priorities Regulation No. 12 and amendments to regulations Nos. 1 and 3. (WPB1423)

Labor policy committee composed of representatives of the AFL, CIO, and railway labor representatives was created by OPA. (OPA121)

Dairy producers, operating under P-118, were given higher ratings for repair and maintenance materials on June 27. (WPB-T513)

M-126 was amended, affecting coffee roasting machinery, manicure implements, and metal tags, on June 26. (WPB1406)

Iron and steel price schedule No. 6 was amended to further stabilize costs of such products, effective June 30. (OPA90)

Hand files were added to the list of hand service tools covered by order E-6, on June 26. (WPB-T511)

PD-25-g reports will not be required from companies operating under PRP after the next report. (WPB-1402)

Truck trailer production has been halted for all non-military use by order L-1-g, issued June 23, effective July 1. (WPB1404)

Iron and steel products sales in quantities just under carload weight to obtain higher prices permitted for L.C.L. shipments is an evasion of schedule 49, OPA warned. (OPA86)

Vanadium melting and deliveries over 10 lb. a month was placed under complete control of WPB in order M-23-a, as amended June 23. (WPB1391)

PRP system under priorities regulation No. 11 was amended June 22 to clarify the interim procedure to be followed by companies that have not received a PRP certificate, and to redefine the permissible use of ratings by companies already under PRP. (WPB1395)

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)

Revisions to the Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

Under "M Orders," page 6, add:

M-18-b... Amended to ease restrictions on use of chrome chemicals for specified uses (6-27-42). Related form: PD-54, consumer monthly report by 8th to producer and WPB.

M-23-a... Amended to control melting and delivery of any amount of vanadium over 10 lb. per month (6-23-42). Related forms: PD-209-a and PD-209-b.

M-53... Amended to ease restrictions on use of chromium in printing inks (6-29-42). Related form: PD-344.

M-68... Amendment No. 5 (6-25-42) clarifies that restrictions in order do not apply to Canadian oil companies to which priority assistance has been extended by a recent amendment to P-98.

M-68-c... Amendment No. 2 (6-25-42) clarifies that restrictions in order do not apply to Canadian oil companies to which priority assistance has been extended by a recent amendment to P-98.

M-81... Amended, prohibiting use of tinplate or terneplate cans for many chemicals, paints, and specified "special products" (6-27-42). Related forms: PD-269 and "Canner's Certificate."

M-126... Amendment No. 2 (6-26-42) permits use of iron and steel for maintenance and repair of coffee roasting machinery; permits use in manufacture of identification, key, name, and price tags for certain uses; and eliminates from List A of order "manicure implements" which are covered by L-140.

M-158... Amendment No. 1 (6-27-42) permits use of exterior drum coating on hand and limits application of order to drums made of 29 gage or heavier steel.

M-154... Assumes control of the distribution of thermoplastics and establishes "ladder of uses" according to importance (6-27-42). A certificate must accompany each order stating that the delivery of such material is in accordance with specified restrictions.

M-178... Allocates from producers butadiene, basic ingredient of Buna-type synthetic rubber (6-27-42). Related form: PD-33.

Under "P Orders," page 13, add:

P-41-c... Assigns blanket rating for material to be used in construction, maintenance and operation of airfields by China National Aviation Corp. (6-26-42). Expires Dec. 31, 1942. Related form: PD-25-a. Rating assigned: A-1-a.

P-46... Extension No. 1 and amendment No. 1 (6-23-42) extends order until Sept. 30, 1942, and establishes new procedure for decentralizing approval of applications for utility extensions to housing units, and other changes.

P-89... Amendment No. 2 (6-24-42) permits chemical producers to build up stocks of coal and coke and extends order until revoked.

P-118... Amendment No. 2 (6-26-42) assigns higher ratings for maintenance and repair materials for processors of dairy products and extends order until Sept. 30, 1942. Ratings assigned: A-1-j and A-3, replacing A-2 and A-3.

Under "L Orders," page 19, add:

L-1-g... Halts commercial type trailer production for non-military use effective July 1 (6-23-42).

L-63... Exemption No. 5 (6-23-42) removes restrictions of order on specified building materials.

L-72... Amendment No. 1 (6-25-42) extends order from June 23 to July 31, 1942.

L-91... Amended to incorporate all amendments to original order governing production and distribution of laundry and dry cleaning equipment and tailors' pressing machinery, and makes other changes. Related forms: PD-418 and PD-419.

Under "E Orders," page 32, add:

E-6... Amendment No. 1 (6-26-42) adds industrial hand files to list of hand service tools covered by the order.

Under "Priorities Regulations," page 33, add:

No. 1... Amendment No. 3 (6-26-42) alters provision with respect to displacement of rated orders by new orders with higher ratings, to conform to regulation No. 12.

No. 3... Amended to conform to regulations No. 12 and 1, modifying previous provisions with respect to simultaneous extension of several different ratings. (6-26-42)

No. 11... Amendment No. 2 (6-22-42) clarifies the interim procedure to be followed by companies which have not yet received PRP certificates and redefines the permissible use of ratings by companies operating under PRP.

No. 12... Provides a new series of high preference ratings for military and related non-military items. Ratings are, AAA, A'A-1, AA-2, etc., and precede present AA and A-1-a series (6-26-42). Related forms: PD-4-y, "Rerating Certificate," and PD-4-x. "Rerating Direction."

PERSONALS . . .

• Burton H. Gedge, assistant to vice-president in charge of operations of American Steel & Wire Co., U. S. Steel subsidiary, has been promoted to new duties specializing in production activities of the vice-president's office. Harry L. Jenter also has been made assistant to vice-president and will concentrate in office work for the vice-president. At the same time J. Dell Baster has been promoted to the position of general superintendent of Cuyahoga Works, Cleveland; Charles M. Sackerson has been appointed superintendent of the cold rolling mills at Cuyahoga, and James W. Futhey has been made general foreman of cold rolling at the same plant.

• Samuel A. Woodruff has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to the division of organic chemistry.

• S. P. Kinney, formerly vice-president of H. A. Brassert & Co., has formed his own company, known as S. P. Kinney Engineers, to handle the manufacture, sale and installation of all accessory equipment previously made and distributed by the Brassert organization. Headquarters will be at 233 Oliver Avenue, Pittsburgh.



WILLIAM M. BLACK, whose appointment as vice-president of the American Brake Shoe & Foundry Co., New York, was announced in these columns last week.

• P. P. Somerville has succeeded the late Robert Gilmore as general manager of the Gilmore Wire Rope Division of the Jones & Laughlin Steel Corp. Mr. Somerville has been with Jones & Laughlin since 1938 when he started with the company to



S. P. KINNEY, head of the newly organized S. P. Kinney Engineers, Pittsburgh.



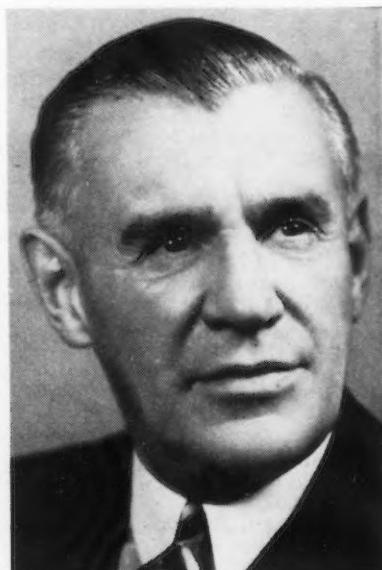
P. P. SOMERVILLE, general manager, Gilmore Wire Rope Division of Jones & Laughlin.

supervise installation of equipment in the plant then under construction at Muncey, Pa. When the new plant went into production he was appointed superintendent, which position he has held since.

• Albert F. Barner, secretary of Cleveland Pneumatic Tool Co., has been elected to a newly-created position, vice-president in charge of finance. Mr. Barner, secretary of Cleveland Pneumatic since 1934, went to work for the company 30 years ago as head of its shipping department, later holding positions in cost, credit and related activities. Harlan B. Collins, recently elected assistant secretary, has been elected secretary.

• George R. Bennett of Buffalo, principal commercial representative of the Bureau of Industrial Conservation of the WPB, has been appointed to act as liaison officer for all disputes arising in the metal salvage drive in New York State outside metropolitan New York area.

• Don U. Bathrick, general sales manager of the Pontiac Motor Division of General Motors Corp. has been appointed assistant to R. H. Grant, vice-president of the corporation in charge of relations between General Motors and the government in connection with war materials.



DON U. BATHRICK, new assistant to R. H. Grant, vice-president of General Motors in Washington.

• **Edsel B. Ford**, president of Ford Motor Co., has been elected president of the Horace H. Rackham Engineering Foundation, Detroit, to succeed Alex Dow, who died March 22. **Alfred C. Marshall**, president of Detroit Edison Co., was elected by the trustees to the board of lifetime trustees and made vice-president in addition to the position of treasurer, which he has held by appointment.

• **Benjamin Sack** has been elected president of Aircraft Screw Products Co., Inc., Long Island City.



BENJAMIN SACK, president, Aircraft Screw Products Co., Inc., Long Island City, N. Y.

N. Y., to fill a vacancy which was created in August, 1941. He was formerly executive vice-president.

• **K. J. Pedersen** of Acme Steel Co., Chicago, has been transferred to Charlotte to handle sales in North and South Carolina. The death of F. G. German and the induction of **G. R. Easley** in the U. S. Army made the shift necessary. With Acme for 20 years, Mr. Pedersen has managed important industrial sales territories including his recent Florida assignment. Mr. Pedersen will maintain headquarters at 2243 Selwyn Ave., Charlotte, N. C.

• **Philip F. Smith**, secretary of the Osborn Mfg. Co. of Cleveland, has accepted an appointment as a senior priority specialist in the Special Industrial Machinery Branch of the War Production Board for the duration of the war.

Electroplaters Discuss Armament Applications

(CONTINUED FROM PAGE 71)

Anodic oxidation of aluminum
Anodic treatment of magnesium
Chromium plating on brake drums

MARINE CONSTRUCTION

Steel Fittings—

Zinc plating

Zinc Plating (Spray or Brush) on Welded Joints of Galvanized Steel Tanks
Chromium or Nickel Plating on Marine Propellers

Chromium Plating Cylinder Liners of Diesel Engines. (Van der Horst)

ILLUMINATION

Searchlights—

Electroforming in copper or iron
Plating surface with silver or rhodium
Anodized aluminum

Landing lights—

Plated with silver

Floodlight Reflectors for Factories—

Plated with silver
Plated with chromium

Mirrors—

Airplane rear vision. Nickel plus chromium plating on steel or brass
Camp wardroom mirrors, either glass using silvered plus copper plate; or sheet steel or brass, using nickel plus chromium plating

Field Ranges—

Zinc plated sheet metal

MEDICAL SUPPLIES

Surgical Instruments—

Copper, nickel, chromium plating

Fracture Splints, Braces, etc.—

Copper, nickel, chromium plating

Bowls and Pans—

Nickel, chromium—preplated sheets

HOUSING—BARRACKS, ETC.

Hardware—

Outside—zinc or cadmium on steel
Inside—copper on steel

Plumbing Fixtures—

Nickel and chromium on brass (hospital)

Conduit and outlet boxes, zinc plated—

COMMUNICATIONS

Radio—

Zinc or cadmium plating of parts

Telephone—

Zinc, cadmium, copper, nickel and chromium on parts
Zinc plated steel wire

ATTIRE AND PERSONAL EQUIPMENT

Clothing—

Zinc, copper, black nickel, oxide coatings on steel buttons, buckles and insignia

Gas Masks—

Black or brown finishes on steel parts

Canteens, Silver Plated Inside

Safety Razors, Silver Plated

MESS EQUIPMENT

Tableware—

Copper, nickel, chromium and silver on steel tableware (RR-T-56)
Same on mess trays

Cooking Utensils

Copper, nickel, chromium and silver on steel pots and pans (Perhaps from preplated sheet?)

Buckets, Garbage Cans, etc.—

Zinc, preplated sheets

OBITUARY . . .

• **Robert W. Keffer**, manager of the order department, American Rolling Mill Co., Middletown, Ohio, died June 24. He was 44 years old.

• **F. C. Waltensperger**, for many years associated with his brother the late A. L. Waltensperger in the Sherwood Brass Works, Detroit, died recently. He was 74 years old.

• **P. A. Barnard**, who retired three years ago after serving 25 years as secretary and treasurer of the Eureka Vacuum Cleaner Co., died a short time ago.

• **H. J. Maxwell Grylls**, president and last of the founders of the firm of Smith, Hinchman & Grylls, Inc., architectural and engineering firm, died June 21, aged 77 years.

• **Hugh Aikman**, secretary and publicity manager of J. H. Williams & Co., Buffalo, died June 20. He was 72 years old. Mr. Aikman joined the Williams Company in 1892, completing 50 years of service last February. In 1900, Mr. Aikman was appointed sales manager of the special forgings division and in 1918 was promoted to advertising manager. In 1920, Mr. Aikman was elected secretary and publicity manager of the company.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Buyers Revising Old Orders; Engine Plants Projected

Cleveland

• • • Changes in old orders, cancellations and substitutions have been frequent for producers, who note that new sales are lighter.

While the opinion seems to be growing stronger that material shortages will react upon the machine tool market later this year, nevertheless several very large new projects are alive currently, including aircraft engine plants in the Middle West.

In the local market sales of single machines are good. Die sinking equipment has been in demand, particularly.

Business Levels Out

• • • With the supply of unskilled male labor apparently plentiful in Cincinnati, but the skilled labor pool virtually exhausted, more at-

tention is being given to the employment of women in local plants. One machine tool plant has been expanding slowly its force of women. Although they have not yet taken over active operation of machines, are tried out in assembly, small castings cleaning, time keepers, and similar types of employment. Several allied metal working plants, however, are expanding steadily their force of women, and one plant has a number of women operating machine tools.

New business has tended to level out and while most plants indicate that there has been considerable cancellation of orders, management is not greatly alarmed over the striking of business from their books. In fact, in one or two instances manufacturers reported that it would have been likely that the cancelled orders would never have been delivered because of inability to get to them.

GREAT ANTI-AIRCRAFT GUN: This aircraft gun being built by Fisher Body Division of General Motors Corp. can knock down bombers virtually from the sub-stratosphere. It is known to have a range in excess of 30,000 ft.



Plants Building Up Reserves

Cincinnati

• • • There has been no change in the market picture during the past week. Some cancellations of orders continue to be reported, but these have not yet affected the production rate, which continues high. Believing, however, that these cancellations may be the harboring of a slow-up in the demand for machine tools, some manufacturers are moving to place themselves in position to meet the decline of machine tool demand. To this end, and being in doubt as to what the ultimate tax bill will be during next year, one or two plants are placing greater proportions of current profits into reserves, with a corresponding postponement or reduction in dividends.

Plant expansions already under way or contemplated before Washington's order to cease expansion are going forward at rapid rate and will, of course, contribute to a further increase in the total output during the current year.

Raw Materials Key Now

Chicago

• • • Belief that the machine tool bottleneck has been largely broken and that the future developments of the war program will depend primarily upon the raw material bottleneck supplies is expressed in authoritative quarters here. There are still a number of ordnance jobs that are not yet fully licked, as for instance the steel cartridge case, but on the whole, tools have been made available where they are needed. Production delays now reflect largely material shortages.

A large share of the tools required for ordnance jobs not yet in full production will be highly specialized and cannot be built until design problems are fully worked out. Inquiries from war plants still in the construction stage are still fairly active in this area, but the dealers' job of scheduling shipments has been considerably simplified by the new allocation system.

NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

No Silver for Non-Essential Users

• • • Deliveries of silver can not be assured to non-essential users at the 35½c. price. Handy & Harman are making no promises on orders which do not carry a rating of A-10 or better, and it appears that Government action will be taken soon to put silver under priority regulation to protect the supply for industrial users. Non-essential users who wish to pay the Treasury's price of 71.11c. per troy oz. will probably find the OPA ceilings will make its use prohibitive.

The silver situation is further clouded by the fact that the Treasury cannot sell domestic silver until our total stocks come up to a certain ratio with gold stocks. H. A. Anderson, chief of the Conservation and Substitution Branch of the WPB bureau of industrial conservation, has characterized as "damnable," the actions of the Silver Bloc responsible for this anomalous situation.

Donald M. Nelson revealed to the special Senate committee investigating defense that the WPB had worked out plans for progressively taking 1,000,000 tons of copper if the metal is needed for the armament program. Without indicating the manner in which the government proposed to acquire the copper he pointed out that a start could be made with name plates and bronze doors, though the WPB does not wish to take doors right away because the metal must be replaced.

While it is generally assumed that brass cartridge cases and copper rotating bands are the principal military uses of copper outside of the electrical field, the Copper & Brass Research Association has pointed out that most American naval vessels are heated by copper convectors. At the same time copper is extensively specified in oil temperature regulators for aircraft engines, and it is used in radiators and oil coolers in most army vehicles.

The 1941 report of Patino Mines & Enterprises is particularly interesting because it shows that this

one company's production is almost equal to our 1942 potential imports of Bolivian tin. Simon I. Patino, president, in a statement accompanying the report, noted the output increase from 12,978 tons of fine tin in 1940, to 15,721 in 1941. Only about 7000 tons were produced in 1939. Production included 49 per cent from the proved ore reserves and the remainder from other sources not included in the reserves. One reason for the price increase recently granted on Bolivian tin is seen in the 10 to 30 per cent wage increases in the Patino mines, plus efforts to substitute Bolivian currency wherever possible for payments in dollars or sterling. All of Patino's production is sold in England and the company plans further capital expenditures to increase output. Total 1941 Bolivian production amounted to 42,740 metric tons of fine tin, as against 38,531 the previous year.

Zinc Production Set Record in 1941

• • • The war program plus lend-lease aid caused a greater demand for zinc in the United States in 1941 than ever before, with a resultant record breaking production

Phelps Dodge Accepts Ruling Under Protest

• • • The War Labor Board has ordered Phelps Dodge Corp. and the several unions involved in two cases pending before it to include in agreements between them provisions for "maintenance of membership," a flat increase of 50c. per day retroactive to April 16, with a minimum of \$4.90 per day, and a seven days' vacation with 48 hr. straight-time pay.

Louis S. Cates, president, announced that Phelps Dodge would comply with the directive. He said, however, that it would comply with the "maintenance of membership" part of the order only because of its belief that a refusal to obey might prejudice the country's war effort.

from both domestic and foreign ores, according to the Bureau of Mines, U. S. Department of the Interior. Production of 881,523 short tons of slab zinc in 1941 was the highest total ever recorded, with both domestic and foreign ores contributing to the increase. Production from the former source advanced 11 per cent, and the quantity produced from foreign ores was 63 per cent greater than the previous high of 104,005 tons in 1916.

The significant part that high grade zinc plays in the manufacture of munitions and other military items is reflected in the continued exceptional demand for this grade. Output of special high-grade was 4 per cent above 1940, and regular high-grade gained 79 per cent, the two grades together accounting for 43 per cent of the total produced in 1941. Prime western output advanced 22 per cent, and it should be noted that prime western which received further treatment to bring it up to high-grade standards is included as high-grade metal and is excluded from the prime western total.

Zinc consumption exceeded supplies coming on the market and, although producers' stocks gained 26 per cent in 1941, the larger inventories of zinc in consumers' hands declined about 11 per cent.

From January through September, 1941, the price of prime western zinc at St. Louis continued at the 7.25c. lb. rate established Sept. 24, 1940. In an effort to expand output from marginal producers the OPA raised the price on Oct. 9 to 8.25c., at which point it remained for the balance of the year. The average quoted price for 1941 was 7.47c. as compared with 6.34c. in 1940.

The monthly average prices of the major non-ferrous metals during June were, in reality, the OPA ceiling prices set on those metals. These prices are as follows:

	Cents per Lb.
Electrolytic copper, Connecticut Valley	12.00
Lake copper, Eastern delivery	12.00
Straits Tin, spot, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65
Lead, St. Louis	6.35
Lead, New York	6.50

SCRAP

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

U. S. Seeks to Spur Importing of Scrap

• • • U. S. representatives, willing to consider almost any expediency which promises to yield steel scrap, have been inspecting accumulations in South America and the Caribbean recently and have found fair tonnages there. The problem of obtaining the necessary ships for transporting the material has not been solved yet, however.

At the same time, at least one private source in the United States is seeking to interest steel mills and the government in salvaging a very large tonnage of under-water scrap in a South American harbor.

Reports from principal steel consuming districts this week indicate that the steel scrap supply situation is growing more serious. Partly, this is a seasonal condition

which usually is expected to end in the Fall. On the other hand, the light scrap grades which are coming to mills at the present time are cutting down steel production. One company which used incoming scrap lost an estimated 7000 tons of production in the first half of June, contrasted with the same part of May, when old but better

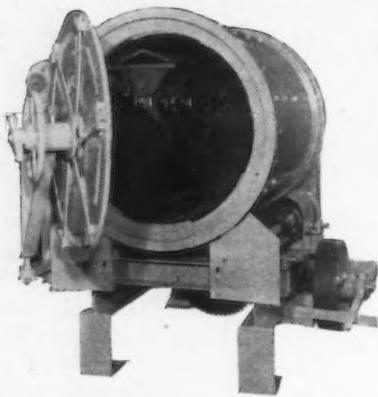
Nelson's comment on the vital role played by scrap starts on page 93.

Report of Murray—BIC controversy is on pages 106-107.

material from the stock pile was consumed.

One feature of the past week was the controversy over scrap between Philip Murray of the CIO and the Bureau of Industrial Conservation, reported elsewhere in this issue.

CLEANING FOR HEAT TREATED—SPRINGS—GUN PARTS— STAMPINGS AND CASTINGS



Belt or Direct Motor Drive

4 NOZZLES—AIR CONTROLLED BLAST

Exhaust Winnows Abrasive Free From Dust

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AT LOWEST MAINTENANCE COST
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continuous service

MODERN DESIGN
steel construction

ADJUSTABLE
for maximum wear of
all parts

SAND
GRIT
SHOT

OPA Hits Inland After Plea for Scrap

Chicago

• • • OPA last week filed a court petition against Inland Steel Co. alleging that the steel company purchased scrap at prices higher than the established maximums and accepted material of a grade inferior to the grade for which the company was billed. Inland is the second steel company in this district to be accused by OPA of violating its scrap price regulations. On Feb. 28, Northwestern Steel & Wire Co. also was subjected to a suit by OPA.

This latest OPA action followed by a few days a meeting here at which scrap dealers were told, in effect, that the success of the war production program depended in a large measure upon how successful they were in bringing out the scrap. They were told they would have to boost the present scrap flow by some 15 per cent if stocks to carry through the winter were to be built up.

From past experience it has been shown that the immediate effect of such suits, particularly lacking the specific details of the violations, is to slow up the flow of scrap because of the hesitancy of the small dealers to make shipments. As the Northwestern case indicated, the alleged violations are often based on technical matters which are usually above the small dealers' head.

Leigh B. Block, vice-president of Inland, asserted, after OPA announced filing the suit, that any violation could have resulted only from the company's single goal of maintaining peak production for victory.

"Inland has been purchasing each month approximately 100,000 tons of scrap," he said. "As a general thing there are no two cars of scrap shipped which are identical due to the fact that scrap by its very nature, varies greatly in shape and form and, under the circumstances, a carload of scrap might contain some material which did not conform to OPA specifications."

"There have been a number of revisions and amendments in the

SCRAP

regulations for the scrap schedule under a law which is comparatively new, and, in consequence, it is only natural that there would be many different interpretations by the large number of people affected by the changes. After a period, however, when all concerned by such rules and regulations become familiar with them, infractions are practically eliminated.

"When some weeks ago the OPA came to us and objected to some of our practices, we at once changed them to suit their wishes. We feel certain that the complaint cannot be based upon any occurrences subsequent to that time."

OPA Rules Improve Scrap Quality, Cut Supply

• • • Rigid OPA scrap grading regulations are generally conceded to be one of the prime causes of the tight situation in the scrap market in eastern Pennsylvania. While steel men are quick to concede that quality has taken a definite turn for the better, inquiry reveals that scrap inventories at the mills are falling off and that they are somewhat less than they were at this time last year.

With the recent Inland Steel citation staring them in the face, mills are afraid to accept cars which they would have welcomed last year. This increase in rejections makes dealers exercise extreme care in loading cars and causes many of them to hesitate to buy from "junkies" who have accumulated household scrap.

Informed quarters suggest that a solution would be to permit the mills to exercise their own judgment on grading, calling in OPA agents for arbitration only.

PITTSBURGH—Scrap collections are no better here and actually are declining further at some points. Anxiety continues over the ability to stock some scrap for next winter and rejections continue at a level as high as a few weeks ago.

CLEVELAND—Consumers report a decline in incoming shipments. It is likely that the recent new regulations involving changes in the scrap schedule may have contributed to the decline. At a few steel plants accumulations towards a winter "reserve" have only reached the size of one or two weeks' supply, thereby lending strength to predictions that this winter will be a much more difficult one for steel plants than the past winter. In the Youngstown and Warren area mills are still operating on a day-to-day basis and a large percentage of scrap is reported to

be moving through allocation. Republic Steel reports that only two of its units are down due to lack of scrap.

PHILADELPHIA—Supply continues to grow more restricted while inventories are falling. The "tremendous quantities" reported as a result of various drives apparently cannot be located, and fear is felt that winter reserves will not be accumulated unless the picture changes substantially in the near future.

ST. LOUIS—A sharp decline in receipts of scrap iron has followed heavy rains and floods in the river areas near here. However, operations in the mills have not yet been affected. Sales of railroad scrap direct to mills are said to be heavy.

CHICAGO—Steel production here is still hindered by a lack of scrap, with one district producer forced to keep two furnaces idle due to lack of scrap. Other plants are still operating largely on a hand-to-mouth basis, with the present high rate of operations being sustained in a large measure by the movement of non-recurring scrap, such as from auto graveyards, community drives, etc.

BUFFALO — The flow into dealers yards has fallen off 15 to 20 per cent in the last few weeks, dealers report. This report is offset, however, by discovery of "at least 5000 tons" of iron and steel in a 40-year-old slag pile. Republic Steel

Corp. has already made arrangements to undertake the salvage work. At the same time, the New York Central announced it will relay its tracks along the Buffalo waterfront, abandoning four steel bridges which will yield approximately 1300 tons of scrap.

BOSTON—Although collections in other parts of the country are reported slowing down, they are increasing in New England due to continued salvage drives. Turnings are fairly plentiful and stocks of mixed borings and turnings with nickel content are accumulating in yards because of shipping restrictions. Automobile scrap is coming out fairly well and an occasional shipment of real No. 1 steel is made. Textile cast is rather scarce as machines are being held for replacement parts. CIO workers have struck for increased wages at a local yard, the first such labor trouble reported in New England.

CINCINNATI—While mills are interested in building inventories, the accumulation is not rapid.

BIRMINGHAM—Off grades continue to be received in this area; but the number of rejections has decreased slightly. Stock pile accumulations are not yet sufficient to insure high capacity operations by the mills during the winter season.

(Turn page for scrap prices)

LEWIN-MATHES Got the right answer at

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from $\frac{3}{8}$ " to 4" and the experience to help you get the most out of this type of machine.



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IF IT'S A QUESTION OF TAPERING,
SIZING OR REDUCING OF ROUND SOLIDS
OR TUBING...
Ask ETNA
About Swaging

SCRAP PRICES

(All the prices given below are per gross tons and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Com- pressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shoveling Busheling; Cast Iron Borings)	Bar Crops, Punch- ings, Plate Billet, Bloom, Forge Crops Scrap and Cast Steel/ Tube Scrap	Heavy Structural and Plate			Cut Auto. Steel Scrap			1 ft. Under Auto. Springs, Free Low Phos., and Crank- shafts			Alloy Auto. Springs, and Sulphur Turnings			Heavy Axle and Forge Turn. First Cut			Electric Furnace Bundles			
				Low Phos.			3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton.....	\$20.00	\$16.00	\$16.00	\$25.00	\$22.50	\$23.00	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00	\$19.50	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00	
Cleveland, Middleport, Cincinnati, Portsmouth.....	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50	17.50	18.75	19.25	19.75	20.25	18.75	19.25
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt., Ashland, Ky.....	18.75	14.75	14.75	23.75	21.25	21.75	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75	16.75	17.50	18.00	19.00	20.50	17.50	19.00
Buffalo, N. Y.....	19.25	15.25	15.25	24.25	21.75	22.25	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	19.25	17.25	18.75	19.25	19.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind., Duluth, Minn.....	18.25	14.25	14.25	23.25	20.75	21.25	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25	16.25	17.75	18.25	18.75	19.25	17.75	19.25
Detroit, Mich.....	17.85	13.85	13.85	22.85	20.35	20.85	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85	15.85	16.50	17.00	18.50	17.00	18.85	17.35
Toledo, Ohio.....																						
St. Louis, Mo.....	17.50	13.50	13.50	22.50	20.00	20.50	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50	15.50	16.50	17.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco.....	17.00	13.00	13.00	22.00	19.50	20.00	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00	15.00	16.50	17.00	18.00	15.00	16.50	18.00
Minnequa, Colo.....	16.50	12.50	12.50	21.50	19.00	19.50	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50	14.50	16.00	17.50	14.50	16.00	17.50	14.50
Seattle, Wash.....	14.50	10.50	10.50	19.50	17.00	17.50	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50	12.50	14.00	15.50	14.00	15.50	14.00	15.50

BUNDLES consisting exclusively of tin coated material and compressed into charging box size, are \$4 per gross ton less than No. 2 dealers' bundles. Bundles containing tin coated material but not composed exclusively of such material (outlawed by order M-24-b) are \$8 below No. 2 dealers' bundles.

NO. 3 BUNDLES: Consists of galvanized sheet scrap and galvanized wire, hydraulically compressed into charging box size, and weighing not less than 75 lb. per cu. ft. Price, \$2 per gross ton less than No. 1 heavy melting scrap.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports \$1; New England \$1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana and Utah. Colorado scrap is remote for Colorado consumers only. The delivered price of remote scrap may exceed by more than \$1, but not more than \$5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than \$5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where more than one grade of scrap is included in a shipment, the maximum price of all scrap in the vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS FOR CHEMICAL USE: No. 1 (new, clean borings containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting steel; No. 2 (new, clean borings containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting steel.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	3 ft. and Under	2 ft. and Under	18 in. and Under	Scrap Rails
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00	
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown....	21.00	22.00	23.50	24.00	24.25	24.50	
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco.....	19.75	20.75	22.25	22.75	23.00	23.25	
Buffalo.....	20.25	21.25	22.75	23.25	23.50	23.75	
Detroit.....	18.85	19.85	21.35	21.85	22.10	22.35	
Duluth.....	19.00	20.00	21.50	22.00	22.25	22.50	
Kansas City, Mo.....	17.00	18.00	19.50	20.00	20.25	20.50	
Kokomo, Ind.....	19.25	20.25	21.75	22.25	22.50	22.75	
Seattle.....	15.50	16.50	18.00	18.50	18.75	19.00	
St. Louis.....	18.50	19.50	21.00	21.50	21.75	22.00	

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under.....	18.00	19.00	20.00
Clean auto cast.....	18.00	19.00	20.00
Unstripped motor blocks.....	17.50	18.50	19.50
Stove Plate.....	17.00	18.00	19.00
Heavy Breakable Cast.....	15.50	16.50	17.50
Charging box size cast.....	17.00	18.00	19.00
Misc. Malleable.....	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Comparison of Prices

(Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel:	June 30,	June 23,	June 2,	July 1,
(Cents Per Lb.)	1942	1942	1942	1941
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate:	June 30,	June 23,	June 2,	July 1,
(Dollars Per Base Box)	1942	1942	1942	1941
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing terne ..	4.30	4.30	4.30	4.30

Bars and Shapes:	June 30,	June 23,	June 2,	July 1,
(Cents Per Lb.)	1942	1942	1942	1941
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00

Wire and Wire Products:	June 30,	June 23,	June 2,	July 1,
(Cents Per Lb.)	1942	1942	1942	1941
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails:	June 30,	June 23,	June 2,	July 1,
(Dollars Per Gross Ton)	1942	1942	1942	1941
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel:	June 30,	June 23,	June 2,	July 1,
(Dollars Per Gross Ton)	1942	1942	1942	1941
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:	June 30,	June 23,	June 2,	July 1,
(Cents Per Lb.)	1942	1942	1942	1941
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 140 to 148 herein.

Pig Iron:	June 30,	June 23,	June 2,	July 1,
(Per Gross Ton)	1942	1942	1942	1941
No. 2 fdy., Philadelphia	\$25.89	\$25.89	\$25.89	\$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

‡For carlots at seaboard.

Scrap:	June 30,	June 23,	June 2,	July 1,
(Per Gross Ton)	1942	1942	1942	1941
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00

Coke, Connellsville:	June 30,	June 23,	June 2,	July 1,
(Per Net Ton at Oven)	1942	1942	1942	1941
Furnace coke, prompt	\$6.00	\$6.00	\$6.00	\$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875

Non-Ferrous Metals:	June 30,	June 23,	June 2,	July 1,
(Cents per Lb. to Large Buyers)	1942	1942	1942	1941
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.875
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

FINISHED STEEL	HIGH	LOW	HIGH	LOW
June 30, 1942	2.30467c.	2.30467c.	\$23.61	\$23.61
One week ago	2.30467c.	2.30467c.	\$23.61	\$23.61
One month ago	2.30467c.	2.30467c.	\$23.61	\$23.61
One year ago	2.30467c.	2.30467c.	\$23.61	\$23.61

1942	2.30467c.	2.30467c.	\$23.61	\$23.61
1941	2.30467c.	2.30467c.	\$23.61	\$23.61
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Mar. 20	22.61, Jan. 2
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71 May 14	18.21, Dec. 17

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	Pitts- burgh	Chi- cago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	10	DELIVERED TO		
													Detroit	New York	Philadel- phia	
SHEETS																
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢			2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢			3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢			4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢				3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes ²	3.80¢		3.80¢										4.55¢		4.18¢	4.14¢
STRIP																
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢			2.75¢	2.22¢	2.48¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)					3.07¢	3.33¢	
TIN PLATE																
Standard eokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						5.38¢	5.34¢
BLACK PLATE																
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			13	4.05¢			3.39¢
TERNES, M'FG.																
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40							
BARS																
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	(Duluth = 2.25¢)		2.52¢	2.80¢	2.27¢	2.51¢	2.49¢			
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.80¢					
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.52¢	2.55¢	2.27¢	2.40¢			
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢			2.49¢	
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit = 2.70¢)							3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢			2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)							2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢								3.47¢		
PLATES																
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ⁽¹¹⁾	2.47¢	2.65¢	2.27¢	2.30¢	2.155¢		
Wrought iron	3.80¢															
Floor plates	3.35¢	3.35¢								3.72¢	4.00¢		3.73¢	3.69¢		
Alloy	3.50¢	3.50¢		(Coatesville = 3.50¢)					3.97¢	4.15¢			3.71¢	3.60¢		
SHAPES																
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)		2.47¢	2.75¢			2.28¢	2.22¢		
SPRING STEEL, C-R																
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)									
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)									
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)									
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)									
WIRE⁹																
Bright ¹⁰	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢		(Worcester = 2.70¢)			3.10¢				2.94¢		
Galvanized																
Spring (High Carbon)	3.20¢	3.20¢			3.20¢		(Worcester = 3.30¢)			3.70¢				3.54¢		
PILING																
Steel sheet	2.40¢	2.40¢				2.40¢				2.95¢				2.74¢		
IRON BARS¹¹																
Wrought single refined	4.40¢															
Wrought double refined	5.40¢															

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Ship plates only. ¹² Common iron bars quoted at 2.15¢ by Terre Haute, Ind. producer. ¹³ Boxed. ¹⁴ Portland and Seattle price, San Francisco price is 2.50c. ¹⁵ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.



Better tool steels have been the goal of Disston manufacturing effort for 87 years. Beginning in 1855 with the first crucible saw steel ever made in the United States, pioneering again in 1906 with America's first commercial heat of electric steel—Disston has consistently sought new and better ways of improving practice and product.

Modern electric furnaces make Disston tool steel today. Only the purest obtainable materials are used. Scrap is carefully segregated—the most accurate metallurgical and chemical controls are employed—casting, forging and rolling are expertly, skillfully supervised.

By being able to hold operations within extremely close limits, Disston can produce extraordinarily

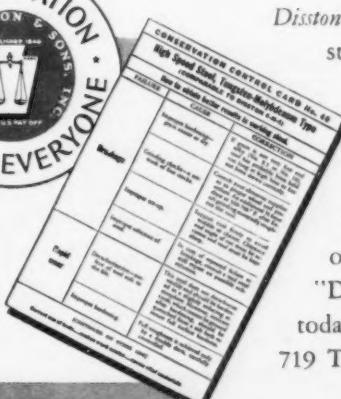
DISSTON SPECIALIZES IN FINE TOOL STEELS

sound and clean alloy and carbon steels with pre-determined grain size—to precise specifications. For example, Disston 6-N-6 High Speed Steel—an exceptional high speed steel combining unusual toughness and remarkable wear resistance and having an excellent response to heat treatment.

Disston engineers at your service: Our technical staff will help you select the most suitable tool steels for the job you have to do—to see that you get the best possible service and longest life from each tool... And if you do not have your *free* copy of the illustrated, 73-page book, "Disston Tool Steels" write for it today to Henry Disston & Sons, Inc., 719 Tacony, Philadelphia, Pa., U. S. A.

FREE DISSTON CONSERVATION CONTROL CARDS

Write for these cards containing expert information on how to get the best results in working any of six different types of tool steels. Supplied free as part of the Disston Conservation Control Plan to save essential tools, time and materials.



PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.25 higher; f.o.b. Duluth, billets only, \$2 higher.

	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.	
Prices delivered Detroit are	\$2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.30c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton

	\$54.00

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron (Butt Weld)

	24	3 1/2
1/2 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Steel (Lap Weld)

	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

Wrought Iron (Lap Weld)

	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron (Same as Above)

	25	6
1/2 in.	31	12
1 to 2 in.	38	19 1/2

Steel (Lap, extra strong, plain ends)

	59	48 1/2
2 in.	63	52 1/2
2 1/2 and 3 in.	66 1/2	56

PRICES

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston†	\$25.53	\$25.03	\$26.53	\$26.03	28.15	.....
Brooklyn	27.65	26.62	27.62	27.12	.....	.....
Jersey City	25.89	25.39	26.89	26.39	.....	.....
Philadelphia	25.00	24.50	26.00	\$25.50	.....	.....
Bethlehem, Pa.	25.00	24.50	25.00	25.50	.....	.....
Everett, Mass.†	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	25.00	24.50	26.00	25.50	.....	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	.....	.....
Sparrows Point, Md.	25.00	24.50	25.00	24.50	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.00	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	24.68	24.68	25.18	25.47	.....	.....
Canton, Ohio	25.47	24.97	25.97	25.47	.....	.....
Mansfield, Ohio	26.06	25.56	26.56	26.06	.....	.....
St. Louis	24.50	24.00	24.50	24.00	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	24.50	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc	26.76	27.26	26.76	26.76	33.00	33.00
St. Paul	24.50	25.00	25.00	24.50	.....	.....
Duluth	20.38	19.00	25.00	25.00	.....	.....
Birmingham	27.25	27.25	27.25	27.25	.....	.....
Los Angeles	27.25	27.25	27.25	27.25	.....	.....
San Francisco	27.25	27.25	27.25	27.25	.....	.....
Seattle	22.00	22.00	22.00	22.00	.....	.....
Provo, Utah	27.50	27.50	27.50	27.50	28.00	.....
Montreal	25.50	25.50	25.50	26.00	26.00	.....

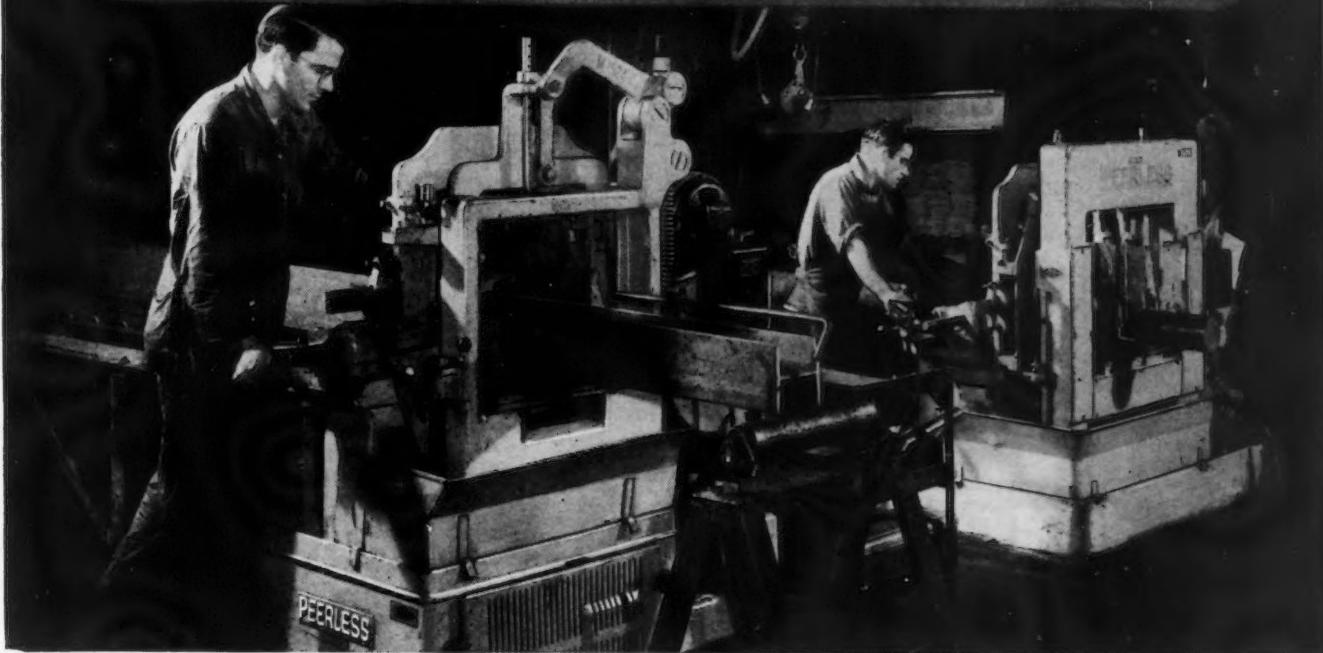
Wrought Iron (Same as Above)

	33 1/2	15 1/2
2 in.	39	22 1/2
2 1/2 to 4 in.	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.



"WE'RE BUYING MORE
WAR BONDS WITH
THE SAVINGS..."



PEERLESS Saws Save on Three Counts ... TIME, METAL AND BLADES

Cutting cold rolled steel in the plant of Caterpillar Tractor Company, Peoria, Ill. A Peerless 14" High Duty, operating at medium speed, cut a 9" bar at a rate of 5 Sq. In. a minute. As high as 8 Sq. In. a minute are cut in similar material when the machine is operated at high speed. A standard 4 tooth, high speed steel blade was used.

TIME is precious! Every hour and every dollar saved by Cutting the Metal the Peerless Way speeds your "Victory" production.

Besides saving time, hundreds of wartime fabricators are saving METAL, too, by doing their cutting on a Peerless. The Patented, Peerless Four-Sided Saw-Frame rigidly holds the thin, cool-cutting blade. Accurate cutting is done at amazingly high speeds.

And, as little as $\frac{1}{16}$ " of the metal is removed. This means less waste—longer BLADE LIFE. Between 1500 and 2500 square inches of metal are being removed with a single \$1.50 blade on a hurry-up war order.*

Ask all about saving the Peerless Way. You'll have more left for War Bonds. Complete details will be mailed on receipt of your coupon request.

PEERLESS MACHINE COMPANY • RACINE, WISCONSIN

Peerless
METAL SAWING MACHINES

FAST, ACCURATE CUTTING DEMANDS POSITIVE BLADE CONTROL

PEERLESS MACHINE COMPANY, Dept. IA-742, Racine, Wisconsin

*Mail complete details on this performance.

- Mail catalog on Hydraulic type Saw for High Production Cutting
 Mail catalog covering Vertical type used for Die Block Work
 Mail catalog on Mechanical type Saw for production cutting
 Mail catalog on general utility and maintenance Saws

Company.....

Individual.....

Street.....

City.....

State.....

PRICES

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)
Base per Lb.

High speed	67c.
Straight-molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

ROOFING TERNE PLATE

	(F.o.b. Pittsburgh, per Package of 112 Sheets)	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00	
15-lb. coating I.C.	7.00	14.00	
20-lb. coating I.C.	7.50	15.00	
25-lb. coating I.C.	8.00	16.00	
30-lb. coating I.C.	8.63	17.25	
40-lb. coating I.C.	9.75	19.50	

NATIONAL EMERGENCY STEELS (Hot Rolled) Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace		
	Carbon	Manganese	Phosphorus Max.	Sulfur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35				.10/.20			.45c	\$ 9.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35				.25/.35			.85	17.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35				.10/.20			.65	13.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35				.10/.20			.65	13.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35				.20/.30			.75	15.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35				.30/.40			.90	18.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35				.30/.40			.90	18.00
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35				.40/.60			1.25	25.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25				.75	15.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25				.75	15.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30				.80	16.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30				.80	16.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30				.80	16.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30				.80	16.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40				.90	18.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40				1.20	24.00
												1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70c, major basing points.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

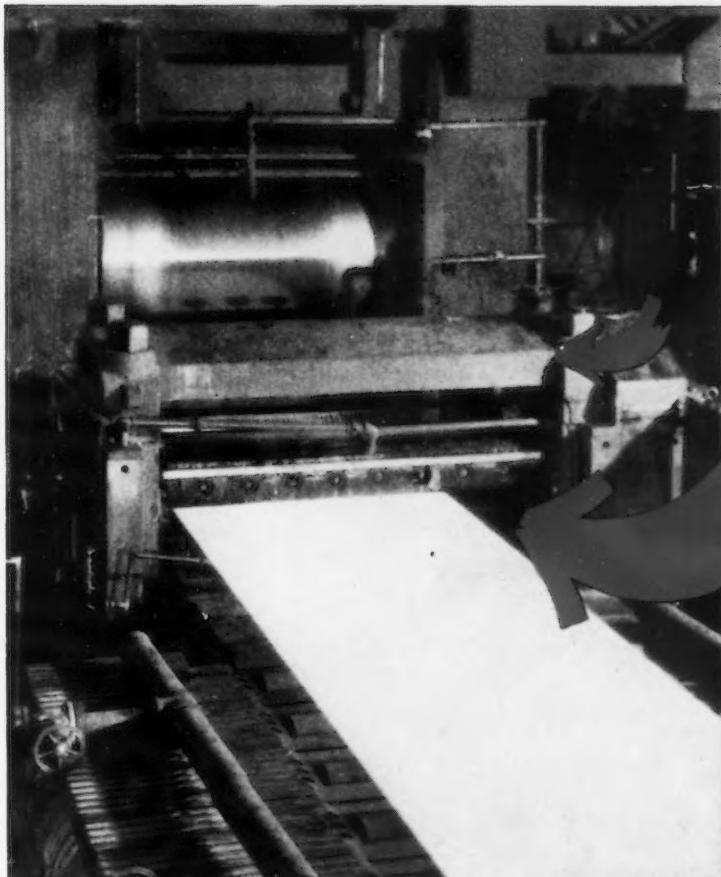
Note: Birmingham base same on above items, except spring wire.

WAREHOUSE PRICES (Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS		STRIP		Plates (1/4 in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled		Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	\$3.35		\$4.65	\$3.60	\$3.20	\$3.40	\$3.40	\$3.35	\$7.45	\$5.75	\$8.40	\$6.75
Chicago	3.25	4.10	4.85 ¹	3.60	3.50	3.55	3.55	3.50	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05 ⁵	5.05	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56
New York	3.58	4.60 ²	5.00	3.96 ⁶	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84
Detroit	3.43	4.30	4.84 ¹	3.68 ⁷	3.40	3.60	3.65	3.43	3.80	7.67	5.97	7.19
Buffalo	3.25	4.30 ¹	4.75 ⁴	3.82	3.52	3.62	3.40	3.35	7.75	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88
Birmingham	3.45 ³		4.75 ¹	3.70 ³		3.55 ³	3.55 ³	3.50 ³	4.48			
St. Louis	3.39	4.24 ²	4.99 ¹	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84
Milwaukee	3.38	4.23 ²	4.98 ¹	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.83
Baltimore	3.50	4.90 ⁵	5.05	4.00		3.70	3.70	3.85	4.04			
Cincinnati	3.42	4.37 ²	4.42 ¹	3.67	3.45	3.65	3.68	3.60	4.00	7.68	5.99	8.50
Norfolk	3.85		5.40	4.10		4.05	4.05	4.00	4.15			
Washington	3.60					3.80	3.80	3.95	4.10			
Indianapolis	3.45	4.25	5.01 ¹	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72
Omaha	3.85	5.32	5.52 ¹	4.20		4.15	4.15	4.10	4.42			
Memphis	3.85		5.25	4.10		3.95	3.95	3.90	4.31			
New Orleans	4.05					3.90	3.90	4.10	4.60			
Houston	4.00					4.05	4.05	3.75				
Los Angeles †	4.95	7.15	5.95	4.90		4.90	4.60	4.35	6.60	9.55	8.55	10.55
San Francisco	4.55	6.40	6.10 ⁷	4.50		4.65	4.35	3.95	6.80	9.80	8.80	10.80
Seattle	4.65 ⁷	7.60	5.70 ⁷	4.25		4.75	4.45	4.20	5.75	8.00		

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: ¹ 500 to 1499 lb., ² 400 to 1499 lb., ³ 400 to 3999 lb., ⁴ 450 to 1499 lb., ⁵ 1000 to 1999 lb., ⁶ 0 to 1999 lb., ⁷ 300 to 10,000 lb. At Philadelphia, galvanized sheets, one to nine bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over. hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity; hot rolled bars, plates, shapes, hot rolled sheets, 400 to

More Tons per Grind



with Heppenstall Shear Knives

Heppenstall Shear Knives stay sharper longer . . . deliver more tons per grind, because they are made of the finest special analysis alloy steel in Heppenstall's own electric induction furnaces. Heppenstall knives are forged, annealed, machined, heat treated, and ground with extreme care and advanced methods developed through more than fifty years of quality shear knife manufacture.

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Forging Fine Steels For More Than Fifty Years

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) \$135.00

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21% \$36.00
Domestic, 26 to 28% 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)
50% (carload lots, bulk) \$74.50
50% (ton lots, packed) 87.00
75% (carload lots, bulk) 135.00
75% (ton lots, packed) 151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)
F.o.b. Jackson, Ohio \$29.50*
Buffalo 30.75*
For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Car-
lots, Lump Size, on Contract)
4 to 6 carbon 13.00c.
2 carbon 19.50c.
1 carbon 20.50c.
0.10 carbon 22.50c.
0.06 carbon 23.00c.

Spot prices are 1/4c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size,
Bulk, on Contract)
3 carbon \$113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferritungsten, per lb. contained
W, del'd carload \$2.00
Ferritungsten, 100 lb. and less... 2.25
Ferrovanadium, contract, per lb.
contained V, del'd \$2.70 to \$2.90†
Ferrocolumbium, per lb. contained
Cb, f.o.b. Niagara Falls, N.Y.,
ton lots \$2.25†
Ferrocobaltitium, 15-18 Ti,
7-8 C, f.o.b. furnace, carload
contract, net ton \$142.50
Ferrocobaltitium, 17-20 Ti,
3-5 C, f.o.b. furnace, carload
contract, net ton \$157.50
Ferrophosphorus, electric or blast
furnace materials, carloads,
f.o.b. Anniston, Ala., for 18%,
with \$3 unitage freight, equaled
with Rockdale, Tenn., gross ton. \$58.50
Ferrophosphorus, electrolytic 23-
26%, carlots, f.o.b. Monsanto
(Siglo), Tenn., \$3 unitage,
freight equalized with Nashville,
gross ton \$75.00
Fermolybdenum, per lb., Mo,
f.o.b. furnace 95c.
Calcium molybdate, per lb. Mo.,
f.o.b. furnace 80c.
Molybdenum oxide briquettes 48-
52 Mo, per lb. contained Mo,
f.o.b. Langloch, Pa. 80c.
Molybdenum oxide, in cans, per lb.
contained Mo, f.o.b. Langloch,
and Washington, Pa. 80c.

*Spot prices are \$5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton
Old range, bessemer, 51.50 \$4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50 4.60
Mesaba, non-bessemer, 51.50 4.45
High phosphorus, 51.50 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore,
Exclusive of Duty)

Per Unit
African, 46-48 Mn 66.5c. to 68c.
Indian, 48-50 Mn 68c. to 70c.

Brazilian, 46-48 Mn 67c. to 68c.
Cuban, 51 Mn 81c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty
paid, delivered \$24 to \$26
Tungsten, domestic scheelite, at
mine \$24 to \$25
Chrome ore, lump, c.i.f. Atlantic
Seaboard, per gross ton; South
African (low grade) \$28
Rhodesian, 45 Nom.
Rhodesian, 48 Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

Connellsburg, prompt \$6.00

Foundry

Connellsburg, prompt \$6.75 to \$7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive

furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago \$12.25
By-product, New England \$13.75
By-product, Newark \$12.40 to \$12.95
By-product, Philadelphia \$12.38
By-product, Cleveland \$12.30
By-product, Cincinnati \$11.75
By-product, Birmingham \$8.50†
By-product, St. Louis \$12.02
By-product, Buffalo \$12.50

(Extractions for less carload quantities)

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft. 5%	5%
20,000 lb. or ft. to 29,999 lb. or ft. 10%	10%
10,000 lb. or ft. to 19,999 lb. or ft. 20%	20%
5,000 lb. or ft. to 9,999 lb. or ft. 30%	30%
2,000 lb. or ft. to 4,999 lb. or ft. 45%	45%
Under 2,000 lb. or ft.	65%

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

Lap	Seamless	Weld,
Cold	Hot	Hot
Drawn	Rolled	Rolled
\$	\$	\$
2 in. o.d. 13 B.W.G. 15.03	13.04	12.38
2 1/2 in. o.d. 12 B.W.G. 20.21	17.54	16.58

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

6 1/2 in. shorter and smaller	65 1/2
6 x 1/2 in. and shorter	63 1/2
6 in. by 3/4 to 1 in. and shorter	61
1 1/4 in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

1/2 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/8 to 1 1/2 in. inclusive	57
1 1/2 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts

U.S.S. S.A.E.

7/16 in. and smaller	64
1/2 in. and smaller	62
1/2 in. through 1 in.	60
9/16 to 1 in.	59
1 1/8 in. through 1 1/2 in.	57
1 1/2 in. and larger	56

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose

71 and 10

Stove bolts in packages, with nuts attached

71

Stove bolts in bulk

80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (1/2 in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

\$3.75

Small Rivets (7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller 60

Upset set screws, cup and oval points

68

Milled studs

40

Flat head cap screws, listed sizes

30

Filister head cap, listed sizes

46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton

\$40.00

Angle bars, 100 lb.

270

(F.o.b. Basing Points) Per Gross Ton

Light rails (from billets) \$40.00

Light rails (from rail steel) 39.00

Base per I.b.

Cut spikes 3.90c.

Screw spikes 5.15c.

Tie plates, steel 2.15c.

Tie plates, Pacific Coast 2.30c.

Track bolts 4.75c.

Track bolts, heat treated, to railroads

5.00c.

Track bolts, jobbers discount

63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

FLUORSPAR

Fire Clay Brick

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail

\$25.00

Domestic, f.o.b. Ohio River landing barges

25.00

No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines

25.00

Foreign, 85% calcium fluoride, not over 5% Cl, c.i.f. Atlantic ports, duty paid

Nominal

Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over

2 1/2% silicon, f.o.b. Illinois and Kentucky mines

\$34.00

As above, in bags, f.o.b. same mines

36.40